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Veterinary Science and Human Welfare

E. C. AUCHTER, B.S.A., M.S., Ph.D.
Washington, D. C.

THERE WAS a time in my life when I was strongly attracted to the profession of medicine, but somehow the combination of circumstances that governs our lives turned me instead to plant science. However, I have always retained a lively interest in medicine and a keen appreciation of its importance to human welfare, and this has been increased since I have had to deal, as administrator of agricultural research, with veterinary problems. The problems of veterinary and human medicine, and their contributions to public health and the general welfare, are at times quite similar. Veterinary medicine is of course consciously and constantly concerned with livestock health as a factor in *productiveness.* If animals are to be productive, they must be kept healthy, and this throws major emphasis on *preventing* disease at all times by all practicable means.

"ROLL CALL" OF ACHIEVEMENTS

A brief roll call of nine important achievements of veterinary science since the turn of the century will help to illustrate what I shall say later, and also to show concretely some ways in which veterinary medicine contributes to human welfare. It will not be necessary to go into detail because you are far more familiar with the details than I am.

1) Thanks to the decisiveness and vigilance of veterinary science in maintaining rigid quarantines and stamping out every incipient outbreak, foot-and-mouth disease has never become established in this country, as it easily might have—and might still some day if we relax our watchfulness. This policy of long standing has safeguarded not only the economic well-being of livestock owners but the food supply of consumers.

2) Sheep scab has been wiped out in the vast range areas of the West, where, at one time, it was the worst single plague of the range sheep industry. Fully 90 per cent of the flocks in some states were affected. There is little doubt that only the vigorous action of veterinary science, through the control program that began about 1905, enabled a great many sheep producers and feeders to stay in business. The problem of eradication in the farm states is more complex but good progress in reducing losses is being made there also.

3) The curse of tick fever has been lifted from the cattle industry of the South and Southwest through the systematic campaign of tick eradication that began in 1906. Even more important, the research that showed how tick fever is transmitted opened the way for the ultimate control of many insect-borne and tick-borne diseases of human beings.

4) The discovery of a preventive serum for hog cholera made it possible to begin a widespread control program in 1913 which has steadily reduced the damage done by this widespread and destructive disease. We no longer have devastating outbreaks such as we used to have. Even one outbreak of the oldtime extent would have badly crippled our wartime pork production.

5) We have much more milk and meat—

Presented before the eighty-first annual meeting of the American Veterinary Medical Association, Chicago, Aug. 22-24, 1944. The headlines are editorial interpolations.

The author is Agricultural Research Administrator, U. S. Department of Agriculture, Washington, D. C.

and many more tuberculosis-free children—than we would have had without the campaign for the eradication of cattle tuberculosis which began in 1917 and has been carried on unremittingly ever since. Instead of 1 tuberculous animal in 20, our herds now show only 1 in 300.

6) The campaign against brucellosis is another of the many cases in which control of a livestock disease affects not only agricultural production but public health, since, as you know, the brucellosis germ may produce undulant fever in human beings.

7) Pullorum disease, for years one of the most discouraging handicaps to poultry production, particularly the hatchery industry, is now being controlled through the detection of carriers by rapid, easily applied methods. Progress in the elimination of pullorum carriers has been rapid since the National Poultry Improvement Plan was begun in 1936.

8) The discovery of a preventive vaccine for equine encephalomyelitis, and the patient uncovering of facts about the transmission of the disease, bid fair to result in increasingly better control of this malady. Vaccination has been actively pushed since 1940. This is another case in which veterinary and human medicine directly complement one another, since the virus of equine encephalomyelitis may produce encephalitis in human beings.

9) One of the most outstanding recent developments in veterinary medicine is the discovery of the value of phenothiazine as an anthelmintic. First announced in 1938, this discovery has already led to better control of a wider range of internal parasites in more different kinds of animals than anything we have ever had, and it came just in time to be of value in war production. Ten million dollars a year is a very conservative estimate of the savings in livestock losses due to the use of phenothiazine. The cost of this discovery was about $10,000, including the part-time salaries of three scientists over a period of five years.

Many more examples of the contributions of veterinary science to human welfare during the past few decades might be given, but these are among the most important. Three things particularly interest me in connection with them.

"ACTION PROGRAMS"

First is the fact that for the most part they are instances of what we nowadays call "action programs." Most of you are aware that in the United States Department of Agriculture, and perhaps elsewhere in the government, a distinction is made between what are called the "oldline" research agencies—several of which are now in the Agricultural Research Administration—and the newer "action" agencies. Sometimes I think there is an implication that the action agencies do things that need to be done, whereas the research agencies just dig around and get a lot of dull facts. The record I have just summarized shows, however, that the veterinarians were past masters at planning and carrying out "action programs" long before that term was thought of. The foot-and-mouth disease, sheep scab, cattle tick, hog cholera, cattle tuberculosis, and cattle brucellosis campaigns are action programs of a particularly clear-cut and far-reaching sort, involving the welfare not only of millions of producers but of many more millions of consumers.

The second thing that interests me about this record is that the programs I have mentioned grew directly out of research. They were not shots in the dark. Rather, they were well-planned and well-conducted attacks on definite objectives. Research showed how cattle-tick fever should be conquered, and the program that followed was, therefore, a sound and successful one. Research developed methods of preventing hog cholera and cattle brucellosis on which action programs could be soundly based. In the case of cattle tuberculosis, the negative results of the search for a preventive or cure over a long period of time showed that the only practical way to deal with this dangerous disease was to remove infected animals, and the tuberculin test, developed and improved by research, made it possible to locate them.

So in veterinary science, research and action go hand in hand. Without competent research, we would not have effective action, and, without action, our research would be a more or less academic exercise.

Most of the research, at least in public agencies, is necessarily directly practical. But back of that practical research are more basic studies, such as those in physiology, bacteriology, biochemistry, parasitology, and others dealing with the nature of disease and immunity. Though much of this basic work has been done outside of state and federal agencies, we do some of it.

Cases in point are the careful studies of the life histories of parasites; systematic examination of related series of chemical compounds for anthelmintic potency; the systematic investigations of the transmission of equine encephalomyelitis and its incidence in many different kinds of animals, including its differentiation into types, its transmission, and the effectiveness of "dead" vaccines for prevention; and the careful studies in the differential diagnosis of vesicular exanthema and vesicular stomatitis, as distinguished from foot-and-mouth disease.

RESEARCH IN ACTION: EXAMPLES

I do not think that we who work in public agencies should entirely avoid basic research just because we are primarily concerned with practical results. Perhaps a certain percentage of our budget should always be devoted to basic studies. For the fact is that this fundamental work often leads to practical results that would never otherwise have been suspected or looked for. The hormone spray now widely used by fruit growers to hold fruit on the tree at harvest time is a case in point. This discovery is now saving growers considerable sums of money every year, but it would not have been made if we had not been carrying on broad fundamental studies of plant hormones.

So far, I have discussed the achievements of veterinary science as examples of effective action programs and as examples of research. In both, high standards have been set and maintained; we all want to see that those standards are kept high, and even improved whenever that is possible.

TOUCHES OTHER FIELDS

Now I want to discuss a third point—the interrelation between veterinary science and other fields. This particularly interests me because the coördination of scientific work in various fields is one of the main functions of the Agricultural Research Administration.

The ARA was set up, as you know, in December, 1941, for the specific purpose of coordinating the scientific research in the Department of Agriculture and focusing it effectively on wartime needs. Eight bureaus and agencies are included—Agricultural and Industrial Chemistry; Animal Industry; Dairy Industry; Entomology and Plant Quarantine; Experiment Stations; Human Nutrition and Home Economics; Plant Industry, Soils, and Agricultural Engineering; and the Beltsville Research Center.

REORGANIZATION SUCCESSFUL

This reorganization has, of course, enabled us to improve various routine administrative, fiscal, and personnel procedures through joint bureau action. But that was not the most important objective. One of the really important things was to modify our whole research program, throughout the bureaus, so as to concentrate the work on war problems—which meant dropping some projects, holding some in abeyance for the duration, changing the emphasis in others, and adding some that were entirely new. Another objective was to coördinate the work in such a way that every project involving more than one bureau would be tackled by all of them coöperatively and simultaneously instead of piecemeal. I believe that we have succeeded reasonably well in both objectives. Under the first, 90 per cent of our research projects are related to war needs, the other 10 per cent representing work that has to be continued, even though on a greatly curtailed basis, to save investments already made. Under the second objective mentioned, we have been able, in the case of several important wartime projects, to get much quicker results by concentrating the resources of several agencies simultaneously on a given problem than would have been possible by having a group of scientists in one field tackle one phase of it, then a group in a different field tackle another phase, and so on.

INTERBUREAU COLLABORATION URGED

The experience gained as a result of the necessities of war can surely be applied in peace. After this war, it is not unlikely that this country will face problems which, though different from those of wartime, will be no less urgent. Scientists will be called on to help solve them. The more we can engage in united effort, the more effective we will be, not only in getting solutions as speedily as possible but in demonstrating the value of scientific research in agriculture and elsewhere.

In urging veterinary scientists to give special thought to the possibilities of further coöperative relationships with scien-

tists in other fields, I can present no set pattern for such efforts. The opportunities vary with different problems. We are still breaking ground in this kind of work; indeed, I think we are only at the beginning of a development that is bound to grow to bigger proportions in the future. Veterinary scientists can contribute to it by creative thinking and experimenting in that direction.

The Phenothiazine Example.—One example of the possibilities is the development of phenothiazine as an anthelmintic, mentioned earlier in this talk. I understand that this idea originally occurred to Harwood, who was then a parasitologist in the Bureau of Animal Industry, as a result of reading the annual report of the chief of the Bureau of Entomology and Plant Quarantine, in which tests of phenothiazine as an insecticide were mentioned. Here was a case of the cross-fertilization of ideas between one science and another. We ought to have more of it. But the anthelmintic use of phenothiazine might have come even sooner than it did if, somehow, the livestock parasitologist had been in closer touch with the entomologist and had known about the latter's experiments from the beginning. On the other hand, veterinary science might not have had phenothiazine today if Harwood had not happened to read that report when he did. How many scientists in one bureau, I wonder, read the reports of other bureaus? My guess is that the number is still relatively small.

Use of Aerosols Promising.—There are other recent developments in entomology that may have a marked effect on veterinary science. I am sure you have followed with interest the development of the aerosol method of dispersing insecticides, the use of synergists to step up the effectiveness of certain insecticides, and the application of DDT for the protection of troops against lice. These developments and others give promise of better control of certain insect vectors of animal and human diseases in the future. It is too early to make predictions, but one might hazard the guess that in limited areas, intensive use of these methods may enable us practically to wipe out some insects. What bearing does this have on veterinary problems? Do synergists offer possibilities with other chemicals besides insecticides? How about the use of aerosol dispersal for disinfectants? I am sure you have already considered these questions, and I raise them here merely to show the relationship between work in different fields and suggest possibilities of joint study.

Selenium Poisoning and Others Also Illustrative.—The study of so-called "alkali disease" made some years ago is another example of these interrelations. In 1931, a group of scientists, including a soil expert, a plant expert, and an animal disease expert, went to South Dakota to investigate this mysterious malady, which, as you know, was found to be due to the fact that certain soils contain toxic amounts of selenium, which is taken up by plants consumed by livestock. The lack of necessary nutrients in soils is even more important to animal health, since it is more widespread than the presence of toxic substances in serious amounts. The relation of lack of iodine to goiter is the classic example. Lack of phosphorus, of cobalt, of copper are other instances of soil deficiencies that seriously affect the health of livestock. This is a relatively new field of research in which there is already fruitful coöperation among the various branches of science involved, and I suggest that this coöperation can profitably be extended. Our Bankhead-Jones laboratory at Ithaca, New York—the United States Plant, Soils, and Nutrition Laboratory—is doing a great deal of work in this field, studying nutrition from the soil right up through the animal and human being, and much of its research should be of interest to the veterinary profession.

In talking about the interrelations between your work and that in other sciences, I realize that I am not suggesting anything new to you. You have carried on coöperative work with scientists in the fields of parasitology and entomology for a long time.

Nutrition, Genetics, Agriculture, Economics Linked in Science.—Nutrition is getting more and more attention in relation to animal disease. You are making some studies in the possible relation of genetic factors to disease, notably at the regional poultry disease laboratory at East Lansing, Michigan. Veterinary medicine, like human medicine, is actively broadening its horizons. That is a natural development. The animal organism is not divided into tight compartments; it reacts as a whole to its whole environment, internal and external. The only reason why scientists have

to specialize in studying this organism is that there is so much to know about it—far more than any individual could learn if he had a dozen lives. But the specialists in one field can work with specialists in other fields to their very great mutual advantage, and I am suggesting that this is a growing trend to which all of us should give conscious and increasing emphasis in planning and carrying out research. The Agricultural Research Administration will do all it can to foster these working relationships, but we need the understanding and coöperation of agricultural scientists outside as well as inside of state and federal agencies.

So far in this discussion, I have been concerned with the relationship of veterinary science to other sciences. But just as we must not isolate one science from another, neither should we confine science as a whole and shut it off from the other activities of human beings. For example, the chief practical aim of veterinary science is to keep livestock healthy. Thereby it makes agricultural production more efficient by reducing its hazards and costs. But this does much more than serve the economic well-being of producers; it also assures a bigger, better, safer, and cheaper supply of foods and other livestock products for the whole consuming public, and that means healthier and more efficient human beings. It is in these terms that veterinary science advances human welfare, and it is in these terms that we must think of its interrelations with a great many social and economic problems, both domestic and international.

Inter-Science Coöperation Vital.—Some of you may say that in touching on these aspects of veterinary science I am getting into the realm of philosophy. But, call it what you will, I believe it is good for all of us in the agricultural sciences to check up on ourselves every now and then and ask ourselves what is our excuse for being—what and how do we contribute to the needs of mankind? For it is certain that the public is going to think of us in those terms, and unless they believe we contribute to human needs in vital and important ways, we are not going to get support for our work.

Here again there is room for much exploratory thinking. We live in a world that has been enormously influenced by scientific and technological developments, which we scientists know are good. The big question is how to use those developments to reduce poverty and suffering and want, a great deal more than mankind has succeeded in doing so far—and, above all, to reduce the chances of the cataclysmic wars that are now becoming more and more destructive and terrible. I am sure that the scientific viewpoint and the scientific method, which are concerned with the search for truth, will result in better understanding and will contribute enormously to the answer to that question. I am sure that it demands and is worth the best thinking we can give to it, as individual scientists and groups of scientists. And I for one am anxious to support any promising developments that look toward the use of science to create a better world.

OBJECTIVES OF THE FAO

It seems reasonably certain that there will be such developments in the postwar period. One of them, which will directly interest veterinary scientists, is the projected Food and Agriculture Organization of the United Nations, sometimes referred to as the FAO. The Interim Commission, set up as a result of the Hot Springs Conference last year, has for some time been working on plans for this organization. Several of us from different countries served on a scientific panel appointed to give the Commission technical advice, and two men well known to this group, Drs. John R. Mohler and Adolph Eichhorn, helped the panel as consultants. As you know, the general objectives of the FAO, when it is established, will be to raise levels of nutrition in the participating countries; help bring about improvements in agricultural production; and better the condition of farmers, who make up two-thirds of the population of the world. Here is a down-to-earth kind of international coöperation that I believe scientists can heartily endorse.

Veterinary Science in the Food-Production Field.—Its interest for veterinary scientists lies in this: When you look into the problems of nutrition, food, and agricultural production in the world as a whole, you find that one of the most serious shortages in many countries is in foods of animal origin—milk and milk products, eggs, and meat. Any such organization as the FAO is bound to have as one of its aims an increase in the production of such foods in the areas where they are badly needed and where livestock can fit into the agricul-

tural economy. It will also necessarily encourage more efficient livestock production in the many areas where production is now extremely inefficient. Neither of these aims can be achieved without putting a great deal of emphasis on adequate veterinary services. You know better than I how serious the disease and parasite problems are in many parts of the world; they have been discussed again and again at your own meetings and those of the International Veterinary Congress. If the Food and Agriculture Organization will actively support your findings and recommendations, and seek your advice, as I believe it will, we can expect a new stimulus to research and an increased application of veterinary science in places where it has been relatively weak.

Sciences Curtail Production Hazards.—There are enough uncertainties to keep any of us from being unduly optimistic about the future. But there are hopeful signs that nations are going to make concerted efforts to bring about more widespread prosperity and a more lasting peace, and the serious attention given to creating a world food and agriculture organization as one of the first steps to that end gives promise of opening new opportunities for veterinary science and the other sciences concerned with agricultural production. Their record of achievement in this war is a remarkable one. I believe that they can do much more to advance human welfare in what we hope will be a long period of peace in the years ahead.

Change Pharmacopoeia Titles?

The Revision Committee of the U.S.P. is considering a proposal to change the title of drugs from Latin to English. Latin titles may be given second place or perhaps dropped. The advocates of the change argue that in everyday use (conversation, medical lists, catalogues, army, hospitals, etc.), the Latin title is never employed, whilst the opponents point out that such a change would not be valid for foreign language editions, nor could it ever be acceptable until the English language earns world-wide acclaim as a basic tongue. Convenient as English titles would be in nonmedical fields, they would confuse the world of medicine to no good purpose and, besides, the pharmacopoeia is primarily a medical book. Argue as one may, we still live in a period wherein Latin is the only universal language of the science field.

A second proposition is to separate therapeutic from strictly pharmaceutical agents, and a third would classify drugs as to their uses (diuretic, analgesic, purgative, etc.). The Committee invites comments on these proposals. The AVMA committees concerned will no doubt speak for the veterinary profession on these radical changes in age-old customs.

Famous Remount Station Closed

Major Richard T. Gilyard, Depot Veterinarian, Columbus (Ohio) Army Service Forces Depot, sends the following information on the present horse situation in the Army of the United States:

The closing of all but three of the seven remount depots of the Quartermaster Corps emphasizes the wane of the cavalry horse in modern warfare.

The depots were known as centers for fine animals and hundreds of stallions have been placed by them with private breeders for the improvement of stock. Those remaining in operation are at Pomona, Calif., Fort Robinson, Neb., and Reno, Nev. At other locations, sales of horses and equipment have been or will be held. Pack animals, however, will still be in use and much pack equipment is available for use.

The Army dog training activities which were also located at remount depots have been centralized at Fort Robinson.

The Front Royal, Va., depot will be abandoned by Dec. 1, with the exception of a skeleton force of personnel. Here facilities will be maintained for the care of several horses, including General John J. Pershing's mount, "Jeff."

In both Tunisia and Italy, mounted cavalry would undoubtedly have been a useful adjunct to military operations, particularly in speed-up advances over difficult terrain by rapid reconnaissance. While the Russians have used, and are still using, cavalry effectively in close cooperation with tank action, following the armored advance and mopping up scattered enemy units which the rapid mechanized advance passed by, it is doubtful whether mounted troops could have materially assisted our own recent swift armored advance across France. In this action, thrusts were so swift and the daily advance so great that only mechanized units were able successfully to coöperate.—*Army and Navy Journal, Oct. 21, 1944.*

"I am afraid," says the Major, "that this is an unfortunate turn of events for the postwar light horse industry in the United States."

The Army Veterinary Service for the Army Air Forces at Mitchel Field, N. Y.

MAJOR W. C. TODD, V.C., U. S. ARMY
Mitchel Field, N. Y.

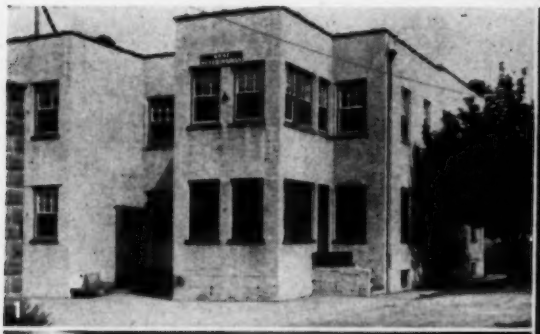
Our country, as well as the veterinary profession and the Army itself, ought to feel indebted to Major W. C. Todd, V.C., U. S. Army, base veterinarian of Mitchel Field, N. Y., for taking the pains to tell the world precisely what the veterinary service does in the midst of an all-out war in this day and age. For the edification of those persons and countries unaware of the development and refinement of the important, life-saving services the modern veterinarian is able to render to the armed forces in training, in action, and in rehabilitation, we seize the opportunity of portraying the operations of the Veterinary Corps at one of the Army air force centers.—EDITORS.

The veterinary service for the Army Air Forces at Mitchel Field, N. Y. may be roughly divided as follows: (1) The inspection of meats, meat-food and dairy products; (2) sanitary control and medical care of the Army sentry dogs and treatment of small animal pets of Army personnel; (3) sanitary control and medical care of the farm animals at the AAF Convalescent Center, Pawling, N. Y., a branch of the Mitchel Field AAF Convalescent Center and Regional Station Hospital; (4) breeding, raising, and medical care of the animals used in the hospital laboratory.

The inspection of meats, meat-food and dairy products is carried out as it is at all other Army stations. All meat and meat-food products for the Air Base are received at the cold storage plant which also serves as a railhead for all Army installations in the immediate vicinity of the Air Base. Here, all the inspection is carried out, including the issue inspection when products leave the plant. Large quantities of canned meats, meat-food and dairy products are also stored in the cold storage plant where they are inspected upon receipt, in storage, and at issue. The photographs show a front view of the cold storage plant, the veterinary office in the plant where records and equipment are kept, a scene in the plant cooler with veterinary personnel inspecting chickens in storage, and a portion of the dry warehouse section where the canned goods are stored. Milk and dairy products are given frequent examinations in the laboratory which is housed in the main veterinary building on the Air Base, as shown in the lower left hand portion of the photograph. Water analyses for the Air Base are also run in the laboratory.

The veterinary service for the Army sentry dogs at Mitchel Field consists of frequent sanitary inspections of the kennels to insure cleanliness, proper feeding and handling of the dogs and, of course, treatment of sick or wounded dogs. Kennels are provided in the cellar of the main veterinary building (fig. 1) for sick or injured dogs. However, considerably more small animal work is done with pets on the Air Base. A dispensary is maintained for this purpose as well as for the sentry dogs (fig. 2). In addition, an operating room is also maintained on the second floor of the main building.

Since the AAF Convalescent Center at Pawling, N. Y., is a branch of the Mitchel Field AAF Convalescent Center and Regional Station Hospital, the veterinary service at Mitchel Field is charged with the care and treatment of all animals at the farm of the Convalescent Center, which consists of a fine herd of registered Guernsey cattle, a small piggery, a fairly large chicken farm, and quite a few Army riding horses as well as a few draft horses and mules. For this purpose, a veterinary dispensary is maintained at the farm, completely equipped for any emergency or any problem of disease that may arise. The front of this dispensary is shown in figure 19. Other photographs taken at the Convalescent Center farm show the cows on the milking line (fig. 20), a case of actinomycosis under treatment (fig. 21), the piggery (fig. 22), a mule at work raking hay (fig. 23), an injured horse being bandaged by enlisted veterinary



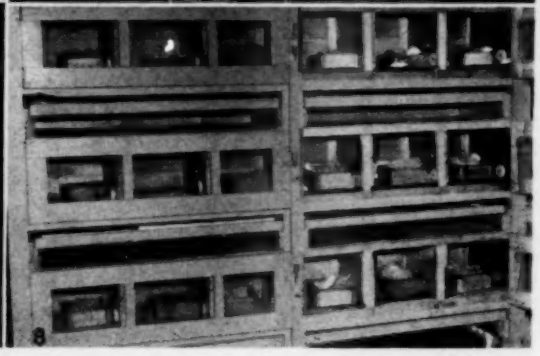


Fig. 1—Veterinary Building at Mitchel Field—Dispensary and office lower right.

Fig. 2—Veterinary Dispensary—examining room on left.

Fig. 3.—Air Base veterinarian's office.

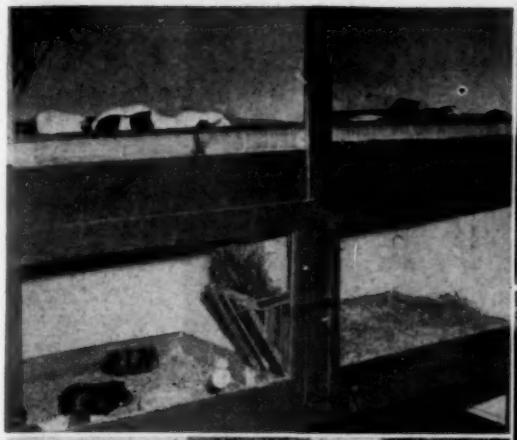
Fig. 4—Major W. C. Todd, V.C., Air Base veterinarian.

Fig. 5—Lieut. Lincoln G. Kutsher, V.C., assistant Air Base veterinarian.

Fig. 6—Enlisted men's quarters—second floor of veterinary building.

Fig. 7—Male rabbits in breeding pens—cellar of vet-veterinary building

Fig. 8—Mice pen battery—west wing of veterinary building.



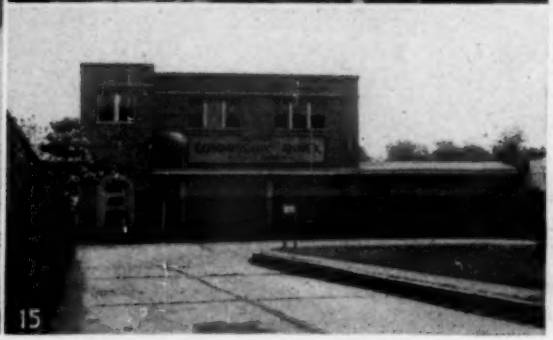


Fig. 9—Guinea pig breeding pens.

Fig. 10—Rabbit and guinea pig hutches—lawn of veterinary building.

Fig. 11—Close-up of rabbit hutch—lawn of veterinary building.

Fig. 12—Sheep pen—converted from garage in rear of veterinary building.

Fig. 13—Bleeding sheep—sterile blood for laboratory use.

Fig. 14—Bleeding rabbit—sterile blood for laboratory use.

Fig. 15—Mitchel Field cold storage plant—veterinary office lower left.

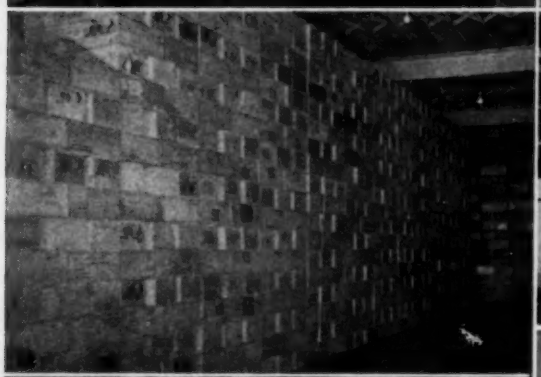


Fig. 16—Veterinary office—Mitchel Field cold storage plant.

Fig. 17—View inside cooler of cold storage plant.

Fig. 18—Dry storage room, Mitchel Field cold storage plant—K rations.

Fig. 19—Veterinary dispensary—AAF Convalescent Center, Pawling, N. Y.

Fig. 20—Part of the dairy herd of registered Guernseys—AAF Convalescent Center, Pawling, N. Y.

Fig. 21—Actinomycosis, AAF Convalescent Center, Pawling, N. Y.

Fig. 22—Pig Pens at AAF Convalescent Center, Pawling, N. Y.

Fig. 23—Raking hay with an Army mule, AAF Convalescent Center, Pawling, N. Y.

personnel (fig. 24), the chicken farm (fig. 25), and stables and corral for the horses (fig. 26, 27). Routine veterinary work on the farm consists of annual TB testing and biannual bleeding for brucellosis (the herd is free of both); annual mallein testing of the horses and mules, also done on receipt or transfer; annual vaccination of the horses and mules against equine encephalomyelitis; vaccination and castration of pigs; pregnancy examination of the cows; and, of course, the treatment of an occasional case of milk fever. Ante- and postmortem examinations are also made on cattle, pigs, and chickens, slaughtered for food eaten at the Convalescent Center.

The production of small laboratory animals and the maintenance of a sheep for the hospital laboratory is the most recent undertaking of the veterinary service at Mitchel Field. A considerable number of rabbits, guinea pigs, and mice are bred and raised for blood used in serologic tests, the Friedman test for pregnancy in women, injection of pathologic organisms for identification, the manufacture of vaccines and serums, and for numerous other purposes. The sheep is bled every three weeks to provide blood cells for the Wassermann test and for the manufacture of mediums. The rabbit's blood is also used in the manufacture of mediums. Most of the young female rabbits are used for Friedman's pregnancy test for women. The guinea pigs and mice are used chiefly for identification of pathologic organisms. Pneumonia typing is also another of the important uses made of the mice. Since all of the animals injected with pathologic organisms for identification are kept in the veterinary building where they are also "posted," isolation cages are provided for these animals in a wing of the building (fig. 1). The photographs show the rabbit and guinea pig hutches, mice pens, indoor guinea pig pens, special pens in the cool cellar for the male rabbits, the sheep in his pen (a converted garage), and

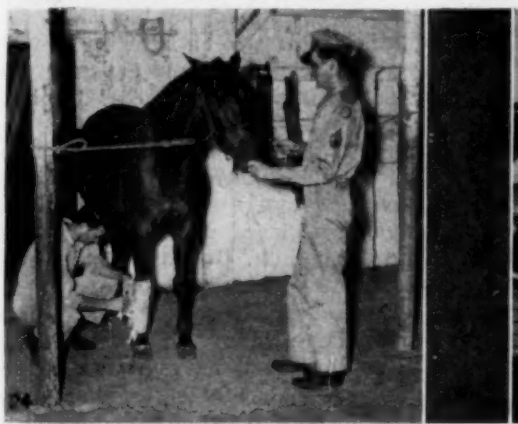


Fig. 24—Veterinary personnel treating an injured horse, AAF Convalescent Center, Pawling, N. Y.

Fig. 25—Chicken pens, AAF Convalescent Center, Pawling, N. Y.

Fig. 26—Corral and water trough, AAF Convalescent Center, Pawling, N. Y.

Fig. 27—Stables, AAF Convalescent Center, Pawling, N. Y.—before installation of slip stalls.

the bleeding procedure used on the sheep and rabbits.

An explanatory outline of the pictures in the order in which they appear follows: The main veterinary building (fig. 1) on the Air Base at Mitchel Field is a renovated apartment house with four apartments, two upstairs and two down, and a cellar. The lower right apartment, as it appears in the photograph, houses the small animal dispensary in the rear, which is shown in a separate photograph (fig. 2) and the main veterinary office, which consists of the two front rooms of the apartment, one room of which is also shown in a separate photograph (fig. 3). Pictures of the two officers are included (fig. 4, 5). The apartment shown in the upper right of the photograph contains the operating room in the rear. The rest of the rooms in this apartment are used as quarters for the veterinary enlisted personnel. Figure 6 shows one of the rooms; there are others. The veterinary enlisted personnel at the Convalescent Center live on the farm there. The cellar houses the dog and cat kennels and special hutches for the male rabbits (fig. 7), where the female rabbits are taken for breeding. A hot-water furnace is also located in the cellar as is an automatic hot-water gas heater. The apartment in the lower left of the photograph contains the milk and water laboratory in the rear while the two front rooms house the mice and guinea pig pens, shown in separate photographs (fig. 8, 9.) Another room in this apartment is used to store the feed for the animals. The apartment in the upper left of the photograph is reserved entirely for isolation cages for those laboratory animals injected with pathologic organisms for identification. Each of the four apartments is provided with a tile lavatory with hot and cold water in the sink and bathtub.

The line of rabbit and guinea pig hutches (fig. 10) is located on the lawn to the left of the building. A closeup of one of the hutches is shown in figure 11. The sheep pen (fig. 12) was converted from a two-car garage back of the main building and is complete with manger, hay rack, and shelter for winter weather. The next two pictures (fig. 13, 14) show the methods used in bleeding the sheep and rabbits for sterile blood. The pictures of the cold storage plant (fig. 15, 16, 17, 18) are self-explanatory and show the front of the plant, the veterinary office, a part of the cooler and part of the dry warehouse.

The picture of the veterinary dispensary at the Center (fig. 19) does not show the inside which is complete with desk, files, refrigerator, porcelain top tables, and medicine cabinets. The rest of the pictures were taken at the Convalescent Center farm and show the animals and poultry under the care of the veterinary service.

Helium

Helium (chemical element 2, atomic wt. 4.002) was first detected in the solar spectrum (1868), hence the name "sungas" that is still in use. It has neither color, odor, nor taste and is thought of mainly as the non-inflammable substitute for hydrogen used in lighter-than-air aeronautics. The helium-gas wells of southwestern United States (Texas, Oklahoma, Kansas, New Mexico) are its source. Production is strictly under federal control. Unimportant amounts are contained in the natural gas of Canadian wells and some of it pours out of the boric acid fumaroles in Italy. Helium is a world monopoly of the American government, practically speaking. The price has dropped from $2,500 to but a few cents per cubic foot since 1917, though its industrial uses other than for the inflation of balloons and blimps have constantly multiplied. Moreover, important places in medicine have been found for helium. It is now being employed to treat respiratory diseases (pneumonia, asthma, bronchitis). It lessens the burden of weakened lungs. Indications foreign to veterinary medicine are caisson disease of workers in compression chambers, "sky bends" of airplane pilots at high altitudes, and "bends" of deep-sea divers, for which a helium-oxygen mixture is employed. During descent from high altitudes and at great depths undersea, helium-oxygen gas prevents the forming of nitrogen bubbles in the body.

Starting Jan. 1, 1945, airplanes will be used by the Census Bureau in mapping 360,000 out of the 6,000,000 farms. The mapping will be done in selected areas by taking aerial photos showing crops, animals, equipment, and terrain. Special personnel is being trained for the duty—*From Science.*

The Veterinarian's Place in Livestock Loss Prevention

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THE MASS MOVEMENT of livestock from the range country and from the farms to market for slaughter or for reshipment to the feedlot has always been accompanied by terrific loss in meat and animal fats as the result of bruising and crippling.

This loss for some time was regarded as inevitable, but finally, about ten years ago, a few representatives of the stockyards companies, encouraged by officers of humane societies, farmers, packers, insurance men, and others, decided to do something about it. And, to that end they organized what has since been known as the National Live Stock Loss Prevention Board. In the meantime, other groups have become affiliated with the organization and the prevention of loss from causes other than livestock in transit has been considered.

One of the larger causes of loss has resulted from the careless and improper handling of livestock in the course of shipment. This loss ranges all the way from the animals killed outright to those only slightly bruised, and is estimated to be 75,440,000 lb. of meat and fats annually. Surely, this is a waste that can and should be greatly reduced. The problem of the elimination of this tremendous loss is a coöperative one, requiring the support of all divisions of industry if it is to be successful.

The Board compiles records of the number of carcasses and parts of carcasses condemned on account of disease, and records of animals that die or are crippled in the movement to market. Surveys are made periodically in representative packing houses to determine the number of different classes of animals that are condemned on account of bruising and the amount of loss from this cause. This information is compiled by the Board and is used extensively in its educational activities to stimulate interest in the program.

Pamphlets and circulars dealing with common diseases and transportation problems that are responsible for heavy losses have been supplied to veterinarians, county agents, 4-H Club leaders, vocational agriculture teachers, livestock commission men, poultry and livestock buyers, truckers, railroad agents, livestock insurance firms, and other interested parties. State Future Farmer organiztions and 4-H Club teams have been encouraged by the Board and substantial awards for teams demonstrating livestock loss prevention are given at county, state, and national fairs.

The press, radio, motion picture, and colored slides have been used extensively to acquaint the general public with the problem.

The officers and directors of the National Live Stock Loss Prevention Board represent numerous interests, including stockyards companies, livestock exchanges, meat packing companies, railway companies, American Meat Institute, livestock associations, humane associations, livestock insurance companies, The Tanners Council of America, U. S. Department of Agriculture, the American Veterinary Medical Association, and others. Prof. H. R. Smith, Chicago, well known for his long and fruitful efforts in promoting and securing financial support in suppressing animal diseases, is general manager of the organization. This group is doing important work and is entitled to our full support.

Under the direction of Dr. Frank H. Leinbach, the organization of the National Livestock Conservation Program was set up, the prime objective being to furnish every farm home with information that will lead to the conserving of livestock through elimination or suppression of disease-producing parasites and that will in other ways raise the level of production through improved practices.

In this movement, which is broken down from nation-wide to state, county, and community, the veterinarians have joined hands with the production specialists and others interested in the general program. The coöperative effort is destined to bring last-

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ing benefits which can already be partially measured in many localities.

In this broad undertaking, the veterinarian holds a key position by virtue of his constant contact with the producers who are in trouble. He is in position to counsel with them and in this way help meet the aims of the organization.

We have been asked on this occasion to define "The Veterinarian's Place in Livestock Loss Prevention." This title suggests three questions, namely:

1) What diseases and conditions are there that cause loss?
2) How great are these losses?
3) What can be done about them?

Some of the principal causes of losses, so far as the veterinarian is concerned, are brucellosis; bovine, poultry, and swine tuberculosis; hog cholera; swine erysipelas; the syndrome of enteric disease and disorders of swine; swine mange; bovine mastitis; Johne's disease; trichomoniasis in cattle; nodular worms of sheep; and cattle grubs. The extent of this combined loss is estimated to be more than $400,000,000 per year.

By the nature of his profession, the veterinarian holds first place in the task of preventing livestock losses. The health and protection of the entire livestock population in his community are largely his responsibility.

At the present time, brucellosis is perhaps responsible for the greatest annual loss of any of the diseases of cattle. Brucellosis in rural sections of the country is attracting the attention of the health authorities at this time. The coexistence of the disease in human beings and animals on the same premises or elsewhere, as in slaughter-houses, has brought us to realize how much we have in comomn with the members of the medical profession and how great is our opportunity for service. Fortunately, most of the state authorities have set up definite and adequate provisions for controlling brucellosis. The question is, how well are you and I trying to fit into the program with the thought of making it a success and prevent loss that would otherwise result? Are we counseling with our friends and telling them how best they can guard against this disease by taking advantage of one or more of the programs which the state has to offer?

Everyone, regardless of what his work and responsibilities in life may be, must appreciate what has been done thus far to suppress diseases of food producing animals and especially those diseases which may be transmitted to the human family. Nearly 4 million cattle were officially consigned to slaughter in the effort to eradicate tuberculosis. In direct correlation to this, the incidence of tuberculosis in human beings has decreased materially. It is common knowledge that at one time whole hospital wards were devoted to children suffering from tuberculosis, most of which was considered to be of bovine origin. This condition no longer exists. But here and there, throughout the country, are a few herds still under quarantine for tuberculosis. We should make our services available to test these herds so the disease may not again become a menace to public health and the livestock industry. The morbidity occasioned by tuberculosis and the price thus far paid to reduce the disease are too great to condone the employment of any palliative or slipshod methods which might result later in the disease getting out of control.

The suppression of both bovine brucellosis and tuberculosis has done much toward purifying our milk supply. This fact, without doubt, has vastly increased the production and consumption of milk and so in this way the control of these animal diseases has benefited both our health and our economic situations.

While bovine tuberculosis has been reduced almost to the vanishing point, yet, in the Cornbelt, it is prevalent in swine and much of it is of avian origin. At some slaughtering centers, as high as 18 per cent of the hogs were retained last year for this cause; the average, however, is about 10 per cent retained because of tuberculosis. This tremendous loss can be better realized when we recall that 4,030,207 hogs were retained for tuberculosis at federally inspected slaughter-houses in 1943. On each hog, there is an estimated average loss of 65 cents or a total waste of pork and pork products to the value of $2,600,000 for the year.

The loss to the poultry industry from premature deaths, lower vitality, and egg production may be still greater.

Are we, as veterinarians, continuing to

direct the attention of our clients to how this loss may be prevented? Do we hold autopsies on as many birds as we should to demonstrate why the swine associated with these birds are later retained for tuberculosis?

According to observations and data gathered by veterinarians in the parts of the Cornbelt where swine erysipelas is most prevalent, approximately 4 per cent of all nonvaccinated swine located in these infected areas die from erysipelas and about 7 per cent are either crippled from arthritis or retarded in their growth.

In vaccinated herds in these same areas, less than 1 per cent of the swine die or are affected with erysipelas in any recognizable form.

Inasmuch as there were 1,364,000 swine vaccinated against erysipelas in 1943, it may be assumed that 136,400 hogs were prevented from having the disease.

Swine erysipelas occurs at all ages and perhaps an average loss of 100 lb. per head would be a fair estimate for all affected animals. Therefore, by vaccinating, a total of 1,364,000 swine, a total of 13,640,000 lb. of pork was saved during the year 1943. 1943.

Beyond this, feed given to swine or labor in the care of swine that later die or are unmarketable is obviously a total loss.

While it is only in recent times that effective control measures have been employed, it is gratifying to know that much less swine erysipelas is appearing in slaughter hogs this year than formerly. As the disease becomes more generally recognized and understood, it is reasonable to assume that the loss will continue to decrease from year to year.

In the syndrome of enteric diseases and conditions of swine where sanitation and good husbandry practices are of great importance, are we showing our clients how their hogs can be improved? It would save a lot of good feed; healthy hogs utilize their feed more profitably. In addition to the loss in weight, the actual loss of hogs and other livestock on the farms resulting from poor management and parasitic diseases is very great.

The nodular worm has long plagued the sheep industry. In fact, on this account, sheep raising has been abandoned in some areas. Loss of condition and impairment of breeding stock due to this worm have been serious throughout the country. Even more deplorable is the fact that the sheep intestine as a source of surgical sutures can no longer be depended upon.

With the thought in mind of making more surgical sutures available by the control of the worm through proper medication of the sheep and rotation of their feeding grounds, the veterinarian can do much to improve this situation.

Do we ourselves fully realize the great hide damage done by the cattle grub? Do we understand that the damage caused by as few as five of these grubs results in the degrading of a hide to No. 2? This means a reduction in price of 1 cent per pound. Some hides have scores of grub holes in them. About 30 per cent of the cattle hides sold in the United States from December to April are damaged by grubs to the extent that they are degraded. Beef trimmed from carcasses affected with grubs last year amounted to more than 10,000,000 lb. Do we lend our best effort and moral support to the degrubbing programs? Such support will mean more beef, better hides, and vastly better shoe-leather—and we need it!

We could give emphasis to the accomplishment of the veterinarians individually or as a group in preventing disease from developing among animals and in eradicating it on a mass basis but all of this is well known to this group and, therefore, our attention is being directed to the tasks which lie ahead.

The present need for meat food, animal fats for glycerin, cattle hides for shoes and other purposes, sheep intestines for surgical sutures, as well as countless other animal products, is so great as to challenge our very best efforts. We should not pursue a course of apathetic shyness lest our deportment be considered bold and unprofessional, but rather let us do the things that are within our realm, realizing there is a war to be won—after that, nations of people to be fed and clothed. Consequently, let each of us, modestly but in a definite way proceed as best we can to prevent livestock losses and in every possible way contribute our utmost towards the relief of the present national emergency.

Twenty-three of the nation's biggest abattoir centers received over 150,000 cattle in one day in September—the largest all-time record.

Antibacterial Substances in Plants

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THERE ARE now available the results of a considerable number of preliminary studies pertaining to the bacteriostatic and bactericidal action of substances contained in one or more parts of green plants. The literature on the subject, with a few important exceptions, has been reviewed recently in a paper by Pederson and Fisher[1] dealing with bactericidal action of fresh juices from certain varieties of cabbage.

Osborn[2] has made the most thorough and systematic search of all for antibacterial substances in green plants. He examined 2,300 species of plants belonging to 166 families. Of these, 63 genera were found on presumptive tests to contain substances which inhibit the growth of either *Escherichia coli* or *Staphylococcus aureus*, or both.

The results of Osborn's study indicate that plants containing antibacterial substances are widely distributed in nature and offer a fertile field for investigation.

The practical use of antibacterial substances in green plants, especially those commonly used as foods, in the prevention and cure of diseases has remained in the speculative stage until a group of Russian workers[3, 4] demonstrated that volatile substances, especially those emitted from fresh onion or garlic pastes, were highly effective in the treatment of infected wounds in rabbits and human beings.

Kovalenok[5] has investigated the action of vapors from juices of *Allium schoenoprasum*, *Allium cepa*, and *Paeonia anomalia* upon several species of living infusoria. One species, *Paramecium cadatum*, when exposed to the vapors from fresh pastes, ceased movement and showed extensive morphological changes within two to nine minutes.

The Russian workers observed that the antibacterial substance contained in bulbs of the genus Allium was highly volatile. The substance was lost thirty minutes after mincing.

The present paper is a brief preliminary report of the results obtained from an investigation of the presence of antibacterial substances in 23 genera belonging to 15 families of fresh and stored plants. Three different plants, two of which belonged to the same genus and which contained considerable amounts of antibacterial substances, were selected for chemical studies and to determine therapeutic possibilities in the treatment of brucellosis in the guinea pig.

As a rule, the various parts of a plant, such as roots, stem, petiole, leaves, and fruit were tested separately. Each part was finely pulverized in a Waring blender, with or without the addition of distilled water, depending upon the amount of liquid naturally present. The liquid extracts were first filtered through cotton cloth and then through a Seitz filter for sterilization. The filtered extracts were then stored at 4 C. for ten to twelve hours before testing.

In examining the juices and partially purified extracts for inhibition of bacterial growth, it was considered desirable to use the serial dilution method in a suitable liquid culture medium in order to obtain a semiquantitative estimate of the amount of the substance present. Each extract, therefore, was diluted two-fold in tryptose broth from 1 : 5 up to 1 : 160. The final volume of the broth in each tube was 5 cc. Each specimen was tested against *E. coli* and *Sta. aureus* and certain ones against *Brucella abortus*. The tubes of medium were shaken constantly during incubation of 37 C. The presence or absence of turbidity in the medium was noted at the end of four and of twenty hours. Further tests were made on the dilutions of certain juices at the end of the incubation periods to determine whether the absence of visible turbidity was due to bacteriostatic or bactericidal action.

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From the sections of Bacteriology and Horticulture, Michigan Agricultural Experiment Station.

RESULTS

Of the specimens examined, antibacterial action against either *Sta. aureus*, *E. coli*, *Br. abortus*, or all three, was demonstrated in certain varieties of six genera belonging to six families. The most active substances were found in one or more species of the genera Allium, Rheum, Ribes, and Riporia. Extracts from only one of these, Allium, have previously been reported as possessing antibacterial properties.

The growth of *Sta. aureus* and *Br. abortus* was inhibited by a 1 : 40 to 1 : 160 dilution of fresh juices from many varieties of domesticated *Allium cepa* (onions), one variety of *Allium sativum* (garlic), one variety of *Rheum rhaponticum* (rhubarb), one variety of *Ribes vulgare* (albine currants), and one variety of *Riporia Labrusca* (green Clinton grapes). In only one instance was *E. coli* inhibited by the diluted juices in a dilution higher than 1 : 20, and then only for four hours. The exception, garlic juice, inhibited growth as high as the 1 : 160 dilution for four hours, and the 1 : 80 for twenty hours.

During the study, the writers were fortunate in obtaining, through the kindness of the director of the Botanical Gardens of the University of Michigan, 18 wild species of the genus Allium for testing. Water extracts of 9 of these inhibited the growth of *Sta. aureus* as high as the 1 : 40 dilution. Most of the extracts failed to inhibit the growth of *E. coli* at the end of the four-hour period of incubation. One wild species of Allium, known as *A. tricoccum*, was of particular interest because of its high activity against both *Sta. aureus* and *E. coli*. The combined roots and stems of the plant were diluted with 5 parts of distilled water for mincing and extracting. The diluted and filtered extract inhibited the growth of both microörganisms in a 1 : 40 dilution. The juices from stems and leaves of all fresh plants of the genus Allium examined, with one exception, possessed very slight antibacterial activity. The exception was chives (*A. schoenoprasum*), the leaves of which contained juice as active as its roots.

Juices from 10 varieties of the species *A. cepa* were tested. Two of these were obtained from the field during the growing season; the others after storage for four to six months. Four of the 10 varieties contained juices of higher activity than the others. Two of these were varieties of stored top-set onions, one known as Ebenezer and one as Brigham yellow globe.

No superior action was noted in juices from fresh onions over those obtained from storage. Juices from highly colored varieties of onions were not so active as those from slightly colored.

The only part of the fresh rhubarb plant containing an antibacterial substance was the petiole. Second growth petioles contained more active material than the first growth ones. The active material in the former disappeared late in the summer.

The fresh juices of all the plants found to contain active substances show little or no loss of activity when heated at 60 C. or below for one hour in a water bath. Boiling for five minutes completely inactivates the agents.

It was considered of interest to attempt the concentration of the active substances in a few of the plants and to determine some of their chemical and physical properties since little, if any, work in this direction has been reported. The juices from the Ebenezer and Brigham yellow globe onions, one variety of garlic, and one variety of rhubarb were chosen for concentration and chemical studies.

Ten-pound lots of the plants were extracted as described in the first part of this paper. Solubilities in fat solvents were determined first. It was found that all activity of one of the substances in all the juices was soluble in chloroform, ethyl ether, and benzene. The substance was extracted from the juices by repeated distribution with chloroform as the solvent. During the extraction process, the *E. coli* inhibiting factor was lost. This inhibiting substance may be associated with the volatile gases of onions and garlic as noted by others. Most of the gumlike residue extracted from onions or garlic, after the removal of the solvent under reduced pressure, was soluble in ethanol. An ethanol insoluble portion had no activity. When the ethanol solution is kept at 4 C. for several days, an inactive fatlike substance is deposited on the sides of the glass vessel. After removal of this substance, the solubility of the partially purified active substance in ethanol was 8 per cent at 4 C. and 20 per cent at 30 C. The resinlike residue obtained from the chloroform extract of the rhubarb juice was purplish black in color and possessed a raspberry

odor. All of the active part of the residue was soluble in warm ethanol, the degree of solubility being 10 per cent at 30C. and 2 per cent at 4 C .

On the basis of dry weight from ethanol solutions, the two varieties of onion bulbs and rhubarb contain approximately 150 mg., and garlic approximately 500 mg. of active substance per pound. The ethanol soluble substances from onions, garlic, or rhubard inhibit the growth of *Sta. aureus* and many other pathogenic gram-positive cocci and spore-forming bacilli during a four- to six-hour period, and *Br. abortus* during a twenty-hour period of incubation in all dilutions up to and including the 1 : 160,000 to 1 : 1,600,000. The other species of Brucella are inhibited to the same degree. The control tubes at the end of the same periods show considerable growth as indicated by turbidity.

At the end of four hours and of twenty hours of incubation, each dilution of the tubes in which there was no visible turbidity was cultured on tryptose agar plates. The action during the first four hours was of a bacteriostatic nature, as there was little, if any, decrease or increase in the number of organisms added. At the end of twenty hours, there was a considerable decrease in the number of organisms, the decrease being directly proportional to the concentration of the plant juice.

When *Paramecium cadatum* was placed in a 1 : 10,000 dilution of the purified extract from garlic in distilled water, a decrease in motility was observed in five minutes. Motility ceased in twenty minutes. After movement has ceased, the anterior end of the Paramecium becomes pointed, the posterior end blunted; the protoplasm is less transparent and shows many large granules.

The active substance from all three of the plants in ethanol solution, or after removal of the ethanol, forms milky colloidal suspensions in distilled water. The onion agent, however, is soluble and stable in water when adjusted to a pH of 7.3 with NaOH. All slowly lose their antibacterial action when held at a pH above 7.5.

Since the vapors emitted from freshly ground onions and garlic have some of the characteristics of allylaldehyde and crotonaldehyde, Vollrath, *et al.*,[5] and Ingersoll, *et al.*[6] have suggested that these substances were responsible for the antibacterial action. The writers have compared the action of crotonaldehyde (Eastman) on a dilution basis with ethanol solutions of the active substances from onions and garlic. The former inhibits the growth of both *Sta. aureus* and *E. coli* to the extent of 1 : 4,000 dilution, while those from the two plants inhibited *Sta. aureus* in a 1 : 320,000 to 1 : 640,000 dilution, but were without action against *E. coli* above the 1 : 1,000 dilution. It is, therefore, apparent that these particular active substances are not crotonaldehyde.

A few qualitative tests have been made on the purified extracts for the purpose of determining their chemical nature. The onion, garlic, and rhubarb extracts in a 1 per cent ethanol solution gave negative reactions with Schiff's and Molish's reagents, and failed to reduce Fehling's solution on heating. All three also gave negative reactions with alkaline sodium nitroprusside, m-dinitrobenzene and benzidine in glacial acetic acid solution. The results of the foregoing qualitative tests would indicate that the active substance in the onion, garlic, or rhubarb extract is not an aldehyde or carbohydrate. Further studies are in progress to determine their chemical nature.

A few experiments have been conducted to determine whether the antibacterial substances in onions and garlic were toxic for experimental animals and whether they possessed therapeutic properties, when administered parenterally or orally. When guinea pigs were injected intraperitoneally with amounts as large as 85 mg. of purified extract from garlic suspended in distilled water at a pH of 7.3, no immediate or delayed objective reactions were observed.

A group of 10 guinea pigs which had been injected ten days previously with 1,500 live *Br. suis* cells (colony count) were injected intraperitoneally twice daily for ten days with 5 mg. of the purified extract from garlic. At the end of thirty days from the date of exposure, the treated pigs, together with an equal number of exposed controls, were killed and examined for evidence of infection. All of the control pigs as well as the treated ones were found to be infected. In addition to being infected, all of the treated pigs showed many adhesions and fibrinous exudate on the viscera and peritoneum.

A similar experiment was carried out on guinea pigs that had been infected with *Br. suis* for twenty days. The 10 pigs were fed

one pound of fresh Ebenezer onions daily for eleven days. On the thirty-sixth day after exposure, the pigs, along with an equal number of controls exposed at the same time, were killed and examined for infection. All pigs in both groups were found to be infected. The extent of the characteristic gross lesions in the organs of the fed groups was just as great as in the controls.

It is realized that the manner of conducting the therapeutic tests was rather extreme, yet if such agents were to be used in the treatment of brucellosis in large animals or in man, their administration would not be instituted until after the disease was well established.

The possible value of most plant antibacterial agents, such as those that occur in plants used for foods, may not lie in their use as therapeutics, but as preventives of infectious diseases through ingestion. Future studies may assign an importance to their value in the prevention of bacterial and parasitic infections as far reaching as that now assigned to vitamins of plant origin in the prevention of deficiency diseases.

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Typhus fever has been held in check by war tension and discipline. But, says a public health authority, the lice may not be as well controlled when the war is over.

In his annual report to the board of trustees of the Johns Hopkins University, President Isaiah Bowman wrote this gem: "We should make a Ph.D. mean something more than proficiency in a small sector of a great subject."

Birthday of the Medical Sciences

Medical science, in the strict use of the term, was born in 1893, when the School of Medicine of the Johns Hopkins University opened its doors to students. Previous to that time there were few requisites for the study of medicine, and too often licenses were given to practice after only an apprenticeship in the office of the village doctor. At that time, an epidemic for starting medical colleges swept over the country. In 1905, there were 160 medical schools, attended by 26,147 "students of medicine" from which 5,506 were graduated. Now there are but 77 schools of medicine on the approved list; just before the war, there were 25,600 students and about 5,700 were awarded medical degrees each year. The present activity in medical science is indicated by the fact that there are now in the United States 162 national and interstate medical societies and 80 journals publishing medical literature.—*From A.A.A.S. Bulletin, September, 1944.*

To be remembered and emphasized and repeated over and over is that the veterinary science situation was precisely the same. In 1893, apprenticeships were being deplored, matriculation requirements were being adopted, state licensure laws were being passed, courses lengthened, and not to be forgotten is that there was also "an epidemic for starting colleges," a mess that took thirty years to iron out, just as it took that long in the field of human medicine. Veterinary literature was scarce. The AVMA had but a small membership list and but few states had going associations.

The big idea is for the veterinary profession to shed its inferiority complex and quit blaming every fault on the poor educational system—it was all we had, all our over-stuffed country chose to maintain. Human medicine had precisely the same stance. To qualify for the work stretching ahead, knowing that veterinary science ran parallel to other branches of learning, would be useful. One who will trouble to look into the development of law, theology, pharmacy, dentistry, and medicine will find that veterinary medicine was always a jump or two ahead of contemporary professions, except for human medicine which never lagged.

Merits and Deficiencies of Mastitis Diagnostic Methods

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IT IS THE PURPOSE of this paper to discuss the merits and deficiencies of the more common methods used in the diagnosis of bovine mastitis.

The Nonspecific Tests.—The strip cup, bromthymol blue, chloride, and catalase tests, as well as the leucocyte count and palpation of the udder for fibrosis, may be classified as nonspecific tests for mastitis. These diagnostic procedures have a common weakness, *i.e.*, they often fail to detect the early and latent cases of infection because a positive test is dependent upon the existence of sufficient tissue injury to result in a detectable change in the milk or udder tissue. The efficiency of the nonspecific tests as indicators of mastitis is influenced by the methods of handling infected animals. Poor management, especially improper milking (incomplete milking, rough milking, too high vacuum with milking machines, leaving machines on too long) aggravates the infection and favors rapid destruction of lactating tissue. Proper care, on the other hand, retards the injurious effect of mastitis upon the udder and, consequently, there is less visible evidence of the existence of the disease. In order to succeed in the eradication of chronic mastitis from a herd, it is necessary to detect every infected cow for segregation and treatment or final disposal. The diagnosis, therefore, should be made with a test or combination of tests, the accuracy of which is not influenced by latency of the disease or by herd management. At the present time, this can be accomplished only through the use of diagnostic procedures which have a bacteriologic basis.

The Microscopic Test.—The microscopic examination of stained smears, prepared from milk incubated at 37 C. for from twelve to twenty-four hours, is described in the literature [1, 2, 3, 4] as an efficient and practical test for the diagnosis of mastitis. The advantage of this method over all others is that it readily reveals streptococci or staphylococci when they are present in the sample—also that the relative degree of reaction that these organisms are inducing in the udder is indicated by the number of leucocytes in the smear. Some investigators [2, 3, 4] have recognized a weakness in the test, and it seems remarkable that this point has not received greater emphasis. The deficiency of the microscopic method originates in the fact that it is impossible to distinguish, with any degree of certainty, between pathogenic and saprophytic streptococci on the basis of morphology in stained smears of milk. This is a serious weakness for several species of streptococci are encountered in milk samples.

A mastitis control program is principally directed toward curtailing the spread of *Streptococcus agalactiae.* This pathogen is the cause of a form of chronic mastitis which is prevalent in dairy herds. Under natural conditions, *Str. agalactiae* multiplies only within the udder and is unable to survive for great lengths of time in any other tissue or organ or in the environs of the dairy farm. Mastitis may also be produced by two other species of streptococci, namely, *Streptococcus uberis* and *Streptococcus dysgalactiae.* These organisms apparently are normal inhabitants of the corrals and barns of most dairy farms and enter the udder by chance from these sources. There is little danger of their spread from cow to cow as is the case with *Str. agalactiae* and, therefore, segregation of animals shedding these organisms in the milk is not essential. In the writer's experience, only a small percentage of the infections with *Str. uberis* and *Str. dysgalactiae* become persistent and lead to clinical mastitis. Strictly saprophytic streptococci also exist on dairy farms and they, too, by chance may find temporary residence within certain udders and thus occur in milk samples.

The principal importance of *Str. uberis, Str. dysgalactiae* and saprophytic streptococci in the mastitis problem is their effect upon the accuracy of the microscopic test as an indicator of infection with *Str. agalactiae.* Since one or more of these species of streptococci can be expected to occur on

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every dairy farm, it is not safe to assume that all streptococci appearing in milk samples are *Str. agalactiae*. If this is not realized by the diagnostician, cows will be classified as positive for mastitis which, in reality, are shedding streptococci other than *Str. agalactiae*. This may lead to serious consequences, since such animals will then be grouped with those infected with *Str. agalactiae*, thus exposing them to a heavy concentration of infection with that pathogen. Also much time and money will be expended in treating such animals when treatment usually is not necessary.

The ability to invade the bovine udder is possessed to a much greater degree by *Str. agalactiae* than by the other species of streptococci. This fact has an important bearing upon the accuracy of the microscopic method as an indicator of infection with *Str. agalactiae* at different stages of a mastitis-control program in a herd. Prior to introducing mastitis control methods in a herd, *Str. agalactiae* has free access to every udder and, therefore, it is the predominating Streptococcus encountered in the milk samples from such a herd. As the spread of this pathogen is curtailed by segregation, chemotherapy, and sanitary milking practices, the udders that are vulnerable to infection but are protected from contact with *Str. agalactiae* often become invaded by other species of streptococci. The microscopic method, therefore, becomes less and less accurate as an indicator of infection with *Str. agalactiae* as the incidence of infection with this organism decreases in the herd. It is possible to develop a herd free from infection with *Str. agalactiae* but it is seldom possible to obtain a herd which will produce milk free from all species of streptococci.

The deficiency of the microscopic method is well demonstrated by the following data: During the first three months of a mastitis-control program in a large dairy herd, 100 cows out of 204 were found shedding streptococci on one or more microscropic examinations of incubated milk. The blood agar plate method, supplemented by sugar fermentation tests, revealed that 80 per cent of the cultures were *Str. agalactiae* and 20 per cent were other streptococci. During the first three months of the second year of the program, 96 cows out of 263 were found positive for streptococci on microscopic examination in one or more tests and 60 per cent of these were proved to be *Str. agalactiae*, while 40 per cent were other species of streptococci. By the end of the second year, *Str. agalactiae* had been eradicated from the herd through a combination of segregation, chemotherapy, and slaughter of cows. However, during the first quarter of the following year, 96 cows out of 277 were positive for streptococci on microscropic test in one or more examinations and these were shown to be *Str. uberis* in 12 cows, *Str. dysgalactiae* in 46, and atypical streptococci in 38 cows. While the microscopic method was 80 per cent accurate as an indicator of infection with *Str. agalactiae* at the beginning of the control program, it was entirely misleading in this respect after *Str. agalactiae* had been eradicated from the herd.

The number of leucocytes associated with the streptococci in a milk sample is an index of the degree of inflammation within the udder, but it cannot be used to indicate the species of Streptococcus in question. Milk may contain *Str. agalactiae* without an increase in leucocytes, especially if herd management is good; on the other hand, while *Str. agalactiae* is often associated with an increase of leucocytes, so also may be infections with *Str. uberis* and *Str. dysgalactiae*.

The Hotis Test.—In 1936, Hotis and Miller[5] presented a new method for detecting mastitis streptococci in milk, to which they gave the name of Hotis test. They described the method as follows:

> The Hotis test consists in adding 0.5 cc. of a sterile 0.5 per cent. solution of bromcresol purple to 9.5 cc. of milk previously measured into a sterile test tube. After the tube is inverted several times to mix the contents, the sample is incubated at 37.5 C. for twenty-four hours. If streptococci are present, the color changes from purple to a yellow shade during incubation as a result of the production of acid from lactose by these organisms. In addition to this change, small flakes or balls of growth from 0.5 to 4.0 mm. in diameter usually form on the side of the tube. They appear as canary-yellow spots attached to the side of the tube and immediately surrounded by a halo of the same color, which in turn gradually merges with the darker background of the column of milk. When *Str. agalactiae* is present in the sample, it is rare that no flakes or clumps are noted. Various shades of color are encountered in tests which may be considered suspicious or positive. These range from blue-gray to a distinct olive color through yellowish green

and a greenish yellow to a pronounced yellow or golden hue. When the first mentioned colors occur, an additional twenty-four hours incubation will usually bring out the yellow color. However, if the indistinct shades are associated with the occurrence of flakes on the side of the tubes, which is very often the case, no further incubation is necessary to indicate a positive result.

Hotis and Miller found that, in an examination of 753 milk samples by both the Hotis test and the blood agar plate method, the two tests were in perfect agreement in 95 per cent of the samples.

Bryan and Devereux[6] criticised the Hotis test, claiming that it left a definite diagnosis of many samples unsettled. Considering the microscopic test as accurate for mastitis streptococci, they found that the 24-hour reading of the Hotis test detected only 52.8 to 64.3 per cent of the composite samples positive for streptococci in the microscopic test, while the 48-hour reading detected from 62.2 to 71.4 per cent. Unfortunately, Bryan and Devereux did not concern themselves with the fact that all streptococci found in milk samples on microscopic test are not *Str. agalactiae*. This no doubt explains much of the discrepancy between their results and those of Hotis and Miller.

McCulloch and Fuller[7] came to the conclusion that the Hotis reaction is an agglutination phenomenon which is not specific for *Str. agalactiae* but may be produced by other species of streptococci.

Murphy[8] compared the Hotis test with the blood agar plate method followed by identification of the streptococci in differential mediums. He found that, regardless of the color of the column of milk after incubation at 37C. or twenty-four hours, only a thick yellow deposit in the bottom of the tube or yellow colonies adhering to the sides of the tube could be considered as positive reactions—thus the intermediate colors described by Hotis and Miller as suspicious reactions were disregarded by Murphy. This was definitely a step forward in the proper interpretation of the Hotis test. On this basis, he found that the Hotis test detected 94.8 per cent of the quarter samples and 96.1 per cent of the composite samples containing *Str. agalactiae*. A further significant observation by Murphy was that streptococci other than *Str. agalactiae* showed a relatively low in-

TABLE I—Summary of Results Obtained with the Hotis Test, the Microscopic Test, and Cultural Methods in a Study of the Bacterial Flora of 4,132 Milk Samples

Consequential bacterial flora	Number of milk samples	Samples showing streptococci on modified Edward's medium	Microscopic Test		Hotis Test			Totals for Hotis test	
			No. pos. for streptococci	No. neg. for streptococci	No. pos.	No. suspicious	No. neg.		
Str. agalactiae...	594[1]	594	557	..	493	45	19	557	594
			..	37[2]	8	6	23	37	
Str. dysgalactiae.	328	328	261	..	31	151	79	261	328
			..	67[3]	2	19	46	67	
Str. uberis.....	115	115	75	..	19	38	18	75	115
			..	40[4]	1	13	26	40	
Atypical-streptococci	346	346	191	..	36	98	57	191	346
			..	155[5]	3	48	104	155	
?	14	0	14	..	1	4	9		14
Micrococci[6]	864	0	..	864	16	318	530		864
Sample sterile or contained bacteria other than streptococci or micrococci[6]	1,871	0	..	1,871	11	242	1,618		1,871
Totals	4,132	1,383	1,098	3,034	621	982	2,529		4,132

[1]43 of these samples also contained another species of Streptococcus.
[2]Microscopic test revealed micrococci in 9 of these samples.
[3]Microscopic tests revealed micrococci in 24 of these samples.
[4]Microscopic test revealed micrococci in 13 of these samples.
[5]Microscopic test revealed micrococci in 69 of these samples.
[6]The term "micrococci" as used here includes diplococci and staphylococci.

cidence of positive Hotis reactions. Little[9] reported a similar observation.

Miller in 1943,[10] published a further report on the Hotis test based on a comparison with the blood agar plate method on over 10,000 milk samples. The test was found to maintain an average agreement with the blood agar plate method of 85 to 90 per cent in the detection of cows infected with *Str. agalactiae*, while only a small percentage of milk containing *Str. uberis* and *Str. dysgalactiae* was positive to the test. Miller added that the occurrence of slightly acid rust-colored flakes on the bottom or sides of the tube was an indication of the presence of *Staphylococcus aureus* in the sample. The writer found that the Hotis test samples showing rust-colored flakes or sediment usually were infected with *Sta. aureus* but that this pathogen did not always induce this change when it was present in the milk.

EXPERIMENTAL

The microscopic test, the Hotis test, and cultural methods were employed at the California Experiment Station in the study of the bacterial flora of 4,132 milk samples obtained from 9 dairy herds having a total of about 1,450 cows. Five of these herds, totalling about 700 cows, were each sampled once only, while the remaining four were tested in part or completely from 4 to 10 times during the period of study. The latter herds had been in a coöperative program for the control of mastitis for at least a year prior to the undertaking of this special study and, as a result, the incidence of their infection with *Str. agalactiae* was comparatively low.

To simplify recording and interpreting the results of the microscopic and Hotis tests, "keys" were developed, which will be given below in their proper sequence.

Methods.—Preliminary observations indicated that the height and width of the column of milk are important in the Hotis test. In a tall, narrow milk column, *Str. agalactiae* is more apt to form yellow adherent colonies on the side of the tube than in a short, broad column. The type of sediment which forms is also important in the interpretation of the test. A flat-bottomed, screw-cap vial, having an outside measurement of 110 mm. by 18 mm., was found satisfactory and was used for collecting the samples in the field for direct use in the Hotis test. Before going to the dairy, 1.0 cc. of a sterile 1 to 300 bromcresol purple solution in distilled water was added to each vial. A 3/4 inch label, placed as high on this vial as possible, indicated a volume of 15 to 18 cc. when milk was drawn into the tube until level with the bottom edge of the label. (One cc. of a 1 to 300 bromcresol purple solution was satisfactory for conducting the Hotis test when between 13 and 18 cc. of milk was drawn into the vial.)

Composite milk samples were usually collected, although, in some instances, quarter samples were taken. To reduce contamination to a minimum, each udder was washed thoroughly with running water and, immediately prior to sampling, chlorine solution (about 400 p.p.m. available chlorine) was applied to the teats, using an individual clean cloth for each cow. An attempt was made to draw about the same amount of milk from each teat into the vial. The sample bottle was then closed as quickly as possible and the milk was thoroughly mixed with the bromcresol purple solution by inverting the vial several times. The samples were kept cool, without icing, until placed in the incubator; however, if they had to be held overnight before going into the incubator, they were refrigerated.

After fifteen to twenty hours at 37 C., the results of the Hotis test were recorded, smears were prepared for the microscopic test in the usual manner from the same samples, using the Broadhurst-Paley[11] method of staining, and, finally, a loopful of the incubated milk was streaked on the surface of modified Edwards' medium for the detection of streptococci. (The original medium developed by Edwards[12] for the isolation of streptococci from incubated milk consisted of blood agar containing crystal violet and aesculin. Due to the shortage of aesculin at this time, Plastridge, Anderson, and Weirether[13] suggested the substitution of inulin, mannitol, and sorbitol. Streaking incubated milk on this modified Edwards' medium was found to be a more efficient method for the detection of streptococci in milk than the usual procedure of preparing blood agar plates with fresh milk.) After twenty-four hours incubation, *Str. agalactiae* usually appeared on the surface of this medium as small, glistening colonies with or without a narrow hemolytic zone. *Str. dysgalactiae* and saprophytic streptococci often developed a faint greenish zone, while *Str. uberis* usually produced a browning of the medium. In this study, the species of streptococci were always proved by transferring typical colonies to serum broth and from there to essential differential mediums for classification in the manner described in a previous paper.[14]

KEY FOR THE HOTIS TEST

Negative Test.—The column of milk ranges from light gray to purple. There may be a few gray colonies or gray sediment on the bottom and side of the tube.

Suspicious Test.—The column of milk ranges from light gray to purple. There may be a narrow, yellowish or greenish ring

in the fluid immediately below the cream layer. A yellowish or greenish discoloration may occur in the fluid near the bottom of the vial, but this disappears as the vial is slowly inverted. There may be a yellow sediment which entirely washes away or a trace remains at the bottom rim when the vial is inverted carefully one or two times. An adherent sediment or colonies may occur on the bottom and sides of the vial which are green, greenish yellow, yellowish green, brown, yellowish brown or greenish brown. At times, loosely adherent tiny white specks appear on the bottom or side of the vial.

Positive Test (1+).—The column of milk is light gray to purple, with one to several yellow adherent colonies on the bottom of the vial.

Positive Test (2+).—The column of milk is light yellow to purple, with a thin layer of yellow sediment on the bottom of the vial. As the vial is slowly inverted, the entire sediment adheres or a portion of it may wash away. There may be a few yellow adherent colonies on the side of the tube.

Positive Test (3+).—Considerable adherent yellow sediment, with or without yellow adherent colonies on the side of the vial. The column of milk usually ranges from green to yellow.

Positive Test (4+).—The column of milk is partially to completely coagulated and distinctly yellow. There may be some digestion of the sample.

Contaminated sample.—The column of milk consists of a gray, coagulated mass which often is partly digested, or the column of milk may be fluid and olive green throughout without the formation of a sediment.

The changes in the Hotis test during incubation are, for the most part, due to acid production from lactose. The secretions from dry udders contain a variable amount of lactose and they are often alkaline. For these reasons, the Hotis test is not reliable for use on dry cows. Samples consisting entirely of a thick, purulent exudate usually show no significant Hotis reaction during incubation, irrespective of whether or not they contain *Str. agalactiae*. Pounden, Beach, and Hastings[15] have suggested adding normal milk to abnormal and dry cow samples in order to circumvent the difficulties encountered when checking these by the Hotis test.

In reading the Hotis test, it is important to distinguish between the true yellow sediment and the off-colored yellows. Daylight was found to be too variable for uniform results but a daylight fluorescent lamp proved to be a satisfactory source of light for this purpose.

KEY FOR THE MICROSCOPIC TEST

To simplify recording the findings on microscopic examination, the following code was used:

Number of Bacteria:
1—Bacteria very scarce.
2—Bacteria scattered, not present in every field.
3—Bacteria present in nearly every field.
4—Very many bacteria in every field.

Type of Bacteria:
St—Streptococci (5 or more cocci arranged in chains).
S—Staphylococci (cocci in irregular clumps; no chains over 4 elements).
D—Diplococci (cocci in pairs or 4 element chains).
Ob—Other types of bacteria.
C—Leucocytes.

A record of 1St, meaning few streptococci only, was considered as much a positive test for streptococci as a record of 4St, meaning very many streptococci. If the cocci were arranged predominantly in clumps, but definite chains of 5 or more elements could be found, two code letters were combined so that a recording of SSt was made. Such a reading was considered positive for streptococci. The length of the chains could not be used as a means to differentiate *Str. agalactiae* from other species of streptococci. In a few instances, it was found that *Str. agalactiae* failed to grow into chains but appeared in the form of irregular clumps of cocci indistinguishable from staphylococci. In recording the number of leucocytes, a numeral preceding the code letter was used in the same manner as for bacteria. Thus, a reading of 4St4C would be interpreted as meaning very many streptococci and very many leucocytes.

RESULTS

A summary of the results obtained with the Hotis test, the microscopic test, and with modified Edwards' medium on 4,132 milk samples is given in table 1. Strepto-

cocci were isolated from 1,383 samples, or 33.5 per cent, on modified Edwards' medium. Differential cultural tests revealed that only 594 of these, or 14.3 per cent of all samples, contained *Str. agalactiae*. The microscopic test was positive for streptococci in 1,098 samples, of which only 557 contained *Str. agalactiae*. Thus, while the microscopic method detected 93.8 per cent of the samples containing *Str. agalactiae*, this pathogen was present in only 50.7 per cent of the 1,098 samples positive for streptococci and, therefore, the microscopic test was in error as an indicator of infection with *Str. agalactiae* in 49.2 per cent of the instances. The Hotis test showed a positive reaction in a total of 621 samples, and 501 of these or 80.6 per cent contained *Str. agalactiae*. The Hotis test, therefore, detected 84.3 per cent of the 594 samples known to contain *Str. agalactiae* and it was in error as an indicator of infection with this organism in 19.3 per cent of the instances.

Of 789 samples containing *Str. dysgalactiae*, *Str. uberis* or atypical streptococci, only 11.6 per cent showed typical positive Hotis reactions, while 46.5 per cent gave suspicious reactions and 41.8 per cent remained negative. Samples containing micrococci also produced some changes in the Hotis test since among 864 of such samples, 1.8 per cent gave a positive reaction, 36.8 per cent a suspicious reaction and 61.3 per cent remained negative.

DISCUSSION

In comparing the results of the microscopic and Hotis tests with those obtained on modified Edwards' medium, it became apparent that, by combining the Hotis and microscopic methods, the valuable features of each could be maintained and the weaknesses of each could be considerably overcome. The suspicious reactions in the Hotis test are confusing and have little differential value when that test is used alone, but when these changes are interpreted in the light of the findings on microscopic examination of smears of the milk, they are of considerable value. The data presented in table 1 show that streptococci, found on microscopic test in samples giving negative or suspicious Hotis reactions, were, in 87.3 per cent of the instances, species of streptococci other than *Str. agalactiae*. The differential value of the Hotis test is lost somewhat if the samples are incubated too long. In this study, incubation was carried on for fifteen to twenty hours and when the samples were incubated for a second fifteen to twenty hour period, some of the suspicious reactions produced by streptococci other than *Str. agalactiae* became positive.

When the Hotis and microscopic methods are combined on the same milk sample, it is not necessary to make a microscopic examination of the samples showing the typical adherent yellow colonies on the sides or bottom of the vial or on samples in which an adherent yellow sediment covers the bottom of the vial or in which the column of milk is coagulated and distinctly yellow. In this study, it was found that such samples always contained streptococci and in as high as 94.0 per cent, the organism proved to be *Str. agalactiae*. However, smears for microscopic examination should be made from all other samples.

The following key was used for classification of samples with regard to mastitis when both the Hotis and microscopic methods were employed.

Mastitis Negative.—The Hotis test is negative or suspicious. No streptococci are found on microscopic examination. Staphylococci may be present, but there is no increase in leucocytes.

Mastitis Suspect.—1) The Hotis test is negative or suspicious. Streptococci are found on microscopic examination, with or without an increase of leucocytes, or staphylococci may be seen associated with an increase in leucocytes.

2) The Hotis test shows a yellow sediment some of which washes away. Staphylococci or no bacteria are observed on microscopic examination.

Mastitis Positive.—1) The Hotis test shows yellow adherent colonies on the bottom or sides of the vial; or a yellow sediment is adherent and well distributed over the bottom of the vial; or the column of milk is partially to completely coagulated and distinctly yellow. No microscopic examination is required.

2. The Hotis test reveals a yellow sediment which partly washes away or there is a yellow sediment adherent near the bottom rim on the side of the vial. Streptococci are found on microscopic examination.

When the foregoing classification key is applied to the data on the 4,132 milk samples presented in table 1, it is found that 83.0 per cent of the samples known to contain *Str. agalactiae* fall into the mastitis positive group, 12.1 per cent into the mastitis suspect group and 4.9 per cent remain in the mastitis negative group. On

the other hand, of 789 samples known to contain either *Str. dysgalactiae, Str. uberis* or atypical streptococci, only 10.9 per cent must be regarded as mastitis positive, 56.6 per cent as mastitis suspects and 32.4 per cent as mastitis negative. The fairly large number of samples containing these latter streptococci which fall into the mastitis negative group need cause no concern. As already stated, the majority of such infections are transitory and do not spread from cow to cow. The principal reason for having a mastitis suspect group, which consists predominantly of cows shedding streptococci other than *Str. agalactiae*, is to bring into that group the few cows shedding *Str. agalactiae*, which, as a result of the reactions of their milk to the combined tests, were classified as mastitis suspect. Also the mastitis suspect group provides a place for cows that are infected with staphylococci which are causing some irritation of the udder as indicated by an increase in leucocyte count.

THE HERD PROGRAM

A mastitis control program should consist of a herd test once each month for three months in order to establish a basic classification of the cows and, thereafter, a test should be conducted at least every three months until such time as the progress made in the control of the disease permits a greater interval between tests. The cows should be grouped for milking according to their classification as mastitis negative, suspect, or positive, and they should aways be milked in that order. This grouping should be started immediately after the results of the first test are available. When a cow has once been classified as mastitis positive, it need not be tested again until after it has been treated; therefore, on all tests after the initial one, only the negative, suspect, recently fresh, and recently treated cows need to be sampled. A suspect cow may be reclassified as negative after passing two clean tests, made at least a month apart. A cow treated while dry should be milked with the suspect group until examined by Hotis and microscopic tests. If a cure has not been produced, the animal should be returned immediately to the positive group. On the other hand, a treated cow may be classified as negative after passing two clean tests made at least a month apart. In addition to the segregation program, it is advisable to apply a chlorine solution to the teats of all animals, but especially to the negative and suspect animals, after each milking. A solution containing about 250 p.p.m. of available chlorine should be prepared fresh at each milking. A cupful of this solution should be used for each udder, after which it should be discarded. Dip the teats in such manner that their entire surface comes in contact with the chlorine solution.

SUMMARY

1) The nonspecific tests for mastitis, such as the strip cup, bromthymol blue, chloride, and catalase tests, as well as the leucocyte count and palpation of the udder for fibrosis, are not sufficiently sensitive as indicators of infection with *Streptococcus agalactiae* for use in a mastitis control program where complete eradication of that pathogen is desired.

2) The microscopic test for mastitis is efficient in demonstrating streptococci, staphylococci, and leucocytes when they are present in incubated milk samples. However, it is not possible to distinguish, with any degree of certainty, between pathogenic and saprophytic organisms on the basis of morphology in stained smears of milk. The microscopic test, therefore, is not specific for *Str. agalactiae.*

3) By segregation, chemotherapy, and sanitary milking practices, it is possible to develop a herd free of infection with *Str. agalactiae.* It is seldom possible, however, to obtain a herd which will produce milk free of all species of streptococci, because the environs of the dairy farm provide a natural habitat for certain streptococci, other than *Str. agalactiae*, which often enter the udder by chance and are shed in the milk. The principal significance of this in the mastitis problem is that the occurrence of other species of streptococci in milk affects the accuracy of the microscopic test as an indicator of infection with *Str. agalactiae.*

4) The Hotis test is highly specific for *Str. agalactiae.* Staphylococci and other species of streptococci may produce changes in the Hotis test during incubation, which, for the most part, are different from those produced by *Str. agalactiae*, but they are not distinctive enough to be of value when only the Hotis test is used. The Hotis test is not reliable when used on secretions from

dry udders or samples consisting entirely of a purulent exudate unless normal milk is added to supply lactose, which is necessary for the test.

5) In a study of 4,132 milk samples, cultural methods revealed streptococci in 1,383 samples, and of this number 594 were *Str. agalactiae* while the remainder were either *Streptococcus dysgalactiae, Streptococus uberis* or atypical streptococci. The microscopic test demonstrated streptococci in 1,098 samples, of which only 50.7 per cent were infected with *Str. agalactiae,* while 49.2 per cent contained other species of streptococci. However, the microscopic method detected streptococci in 93.8 per cent of the samples known to contain *Str. agalactiae.* The Hotis test detected 84.3 per cent of the samples known to contain *Str. agalactiae,* while 19.3 per cent of the Hotis positive samples were not infected with this pathogen but contained other species of bacteria.

6) By using the Hotis method to supplement the microscopic test, it was possible to distinguish presumptively between *Str. agalactiae* and *Str. dysgalactiae, Str. uberis* and atypical streptococci in 87.3 per cent of the samples containing the latter organisms.

7) In a mastitis control program, it is not desirable to place cows shedding *Str. uberis, Str. dysgalactiae,* atypical streptococci, or staphylococci in the same group as those infected with *Str. agalactiae.* A combination of the Hotis test and the microscopic methods provides an efficient and practical means for a presumptive differential diagnosis of the bacterial flora of incubated milk samples.

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K-9s Get First Aid

Quartermaster Dog Platoons, composed of scout and messenger dogs, carry their own veterinary technician, who is trained and equipped to render first aid to sick and injured dogs and to care for them. These platoons are proving of great value to patrols, especially in the Pacific theater, where they are locating snipers and camouflaged Jap positions.—*News Release No. 5, Technical Information Division, Surgeon General's Office.*

Over 21,500,000 pounds of meat, meat food, and dairy products are being inspected daily in the continental United States for the armed forces by the Meat and Dairy Hygiene Branch, Veterinary Division of the Army Medical Department, according to figures recently released by the Technical Information Division of the Surgeon General's Office. In the month of June, rejections for all reasons ran 3.3 per cent.

Running Fits Prevented and Cured by Raw Protein

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RUNNING FITS or fright disease is a well-known disease of dogs which for several years has been suspected of being due to some nutritional deficiency. The claim has been made that the condition may be prevented or cured by thiamin[1] and that it may be due to a deficiency of lysine in the diet.[2] It has also been stated[3, 4] that the condition is hereditary and may be precipitated by a variety of causes.

It is well known that certain commercial dog foods, made up of cereals and other wholesome ingredients baked at high temperature for relatively long periods, may regularly induce the disease. Such a food, here designated as FPF (fit-producing food), manufactured from good cereal and other products, baked at 300 F. for twenty minutes, and dried for ninety minutes at 200 F., was reputed to produce the disease. A large sample was provided by the manufacturer and a test was made in this laboratory on 1 young female, BW 360, half Cocker Spaniel and half Fox Terrier, born in our colony.

The animal was "dewormed" at intervals but worms were not expelled. Intestinal parasites seldom occur in the colony because it is isolated from any possible sources of infection.

At 2 months of age, this pup was weaned to a mixture of dry dog foods supplemented with 20 per cent prune paste. The dog was of normal size at birth and grew satisfactorily during the nursing period. For seventy-six days, it grew slowly on the mixture of well-known dry dog foods and had no fits of any kind or any other abnormal symptoms. At this time, when it was 130 days old, it was selected as a subject for the fit-producing food test. The dog was placed on the suspected food, FPF, with nothing else given except water. On the fifth day on this food, the dog had two fits, which recurred, becoming more severe, although it was given 2 mg. thiamin by mouth on each of three succeeding days and 100 mg. choline by stomach tube on the third day. Fits continued and were almost continuous.

On the eighth day, the dog was placed on stock diet, made up of casein, dry milk, fat, yeast, wheat germ, and salts, 50 Gm. per kilogram per day. There were no fits at any time during the fifty days while this food was fed and there resulted a rapid spurt of growth.

On the fifteenth day on this diet, a water extract of FPF was given in amount equivalent to the former daily intake of the food. There were no fits for seventeen days. Then the residue of an ether extract of FPF was given for fourteen days along with stock diet. There were no fits. The stock diet was discontinued and FPF feeding resumed, and on the tenth day fits began.

On the fifteenth day, 10 mg. pyridoxine* was given intraperitoneally. Severe fits continued while this treatment was maintained for fifteen days. Fits continued on FPF thereafter for thirty-eight days while no supplement was given.

Then 20 Gm. raw casein was given, and for thirty-one days this amount of casein daily continued along with FPF. No fits were observed and the dog's condition greatly improved. On the fourth day after the casein was withdrawn, fits began and continued for eighteen days. The manufacturer then supplied an "improved" FPF which was fed for sixty-three days with frequent fits resulting.

A 5-Gm. supplement of washed casein was then given daily, with alleviation of fits but occasional mild ones observed for the following 100 days. The dog was then sacrificed at 15 months of age. The weight record is shown in figure 1.

Thus, it was found that with this particular dog food, (1) fits could be regularly induced in this subject within a few days; (2) thiamin, choline, and pyridoxine were ineffective additions to the diet, even though each was given separately in generous amount; (3) neither water-soluble nor ether-soluble toxic constituents were present

From the College of Agriculture, University of California.

*The pyridoxine hydrochloride was furnished by Merck & Co., Rahway, N. J.

in the food since such extracts of the food fed along with a normal nonfit-producing diet caused no symptoms; (4) raw casein, 20 Gm. daily, almost instantly stopped the fits, which were resumed when the casein supplement was removed; (5) washed casein, 5 Gm. daily, was inadequate to stop the fits but diminished their number and severity. The FPF contained 20.4 per cent protein and the stock diet 36 per cent protein.

On autopsy, the only abnormalities noted were hyperplasia of the adrenal cortex with adenoma formation and cloudy swelling of the renal tubules†.

Serum proteins were determined‡ just before the raw casein treatment was begun when the animal was in bad condition, having frequent fits. Total serum protein was 5.63 Gm. per 100 Gm. serum; albumin, 3.68; globulin, 1.95; and nonprotein nitrogen, 28.8 mg. The per cent cells was 39. Three months later while 5 Gm. casein daily was being given, an alleviating but not curative dose, the total serum protein was 6.70 Gm. per 100 Gm. serum; nonprotein nitrogen was 30.8 mg. and per cent cells, 42. Three months later on the same regime, total serum protein was 6.01 Gm. per 100 Gm. serum; albumin, 4.09; globulin, 1.92; non-protein nitrogen, 39.0; and per cent cells, 45. The definite rise in serum protein accompanying the casein administration supports the view that the dog had been suffering a protein deficiency. However, some rise in serum protein is expected as dogs mature.

The larger casein supplement, 20 Gm. daily, containing 16 Gm. protein, which was completely effective in preventing the fits, was given as crude raw acid-precipitated dried casein. The smaller supplement, 5 Gm. daily, was given as acid washed dried casein. This form of casein has been found previously in this laboratory[5] to be of lower biologic value than raw casein. Whatever the defect in the fit-producing food, un-

†We are indebted to Dr. David Singman, Department of Pathology, University of California Medical School, for the examination of the tissue specimens.

‡The blood analyses were made by Elsie O. Weast.

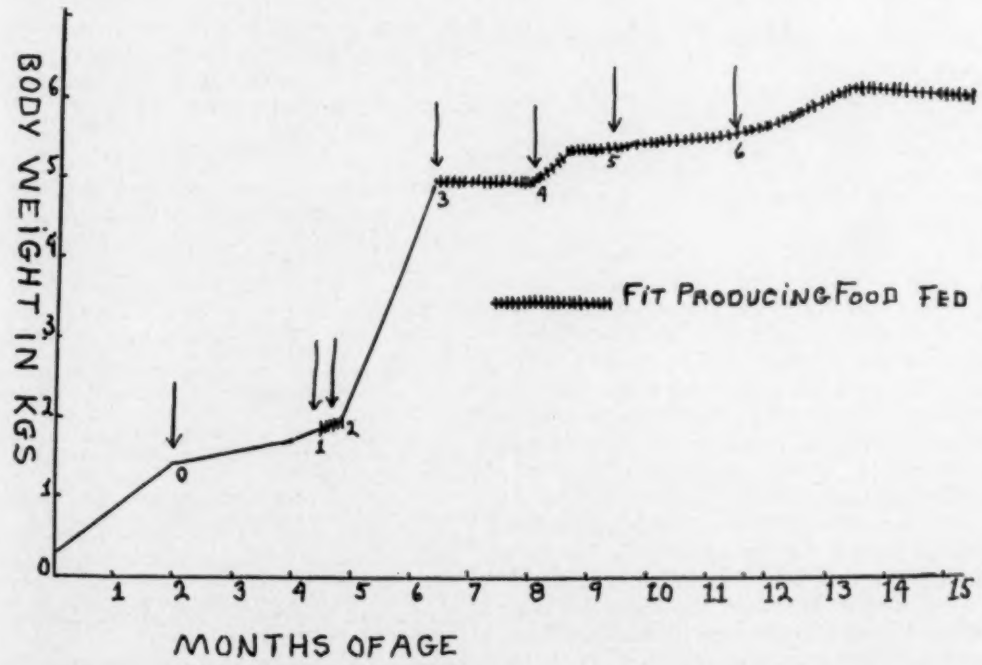

Fig. 1—Weight of dog fed a fit-producing heated diet.

(0) Weaned to a mixture of commercial dry dog foods: (1) fed only the heated food, fits occurred; (2) changed to stock diet, no fits; (3) put back on heated food, fits occurred; (4) given supplement of 20 Gm. raw casein daily, no fits; (5) casein supplement discontinued, fits recurred; (6) given supplement 5 Gm. washed casein, occasional fits.

altered raw casein, 16 Gm. daily, was sufficient to remedy it.

The astonishing suddenness of the appearance of the symptoms would point to a toxic rather than deficiency origin. Our experiments with extracts of the FPF along with stock food, producing no symptoms and of complete freedom from symptoms when FPF was fed along with 20 Gm. raw casein, indicate but do not prove that the origin is not a toxic substance but an amino-acid deficiency.

These results are in accord with those of Arnold and Elvehjem[2] who used 5 dogs, 4 of which died of the disease, although all had been protected for various intervals by additions of casein to the diet. One dog was protected for five days by daily injections of 0.25 Gm. lysine dihydrochloride, and recovered completely when 10 per cent purified casein was added to the heated diet.

The evidence that lysine deficiency is the cause of the fright disease is not conclusive, but there appears little doubt that some amino-acid deficiency or deficiencies are involved.

SUMMARY

A commercially manufactured heated cereal dog food, containing 20 per cent protein, produced running fits in a young dog within five to ten days when fed alone. Thiamin, 2 mg.; choline, 100 mg.; and pyridoxine, 10 mg. per day were ineffective in preventing the fits when fed along with the heated diet.

When a good stock diet containing 36 per cent milk protein was substituted, the symptoms ceased at once and rapid growth resulted. Prolonged administration of either water or ether extracts of the heated diet along with the stock diet were ineffective in producing fits.

When the heated diet was resumed, however, the fits appeared nearly at once. The administration of 20 Gm. raw casein daily produced an immediate cure, but 5 Gm. daily of washed casein was only partly protective.

The total serum proteins and serum albumin were somewhat lower than normal when the heated diet was fed and increased after the casein treatment.

Recently, two new samples of this same food, FPF, were supplied by the manufacturer, representing two further modifications of the formula; one of which was said to have a meat meal constituent without heat treatment added after the baking of the other ingredients. This is called the "new 1944" formula. The "old 1943" formula was similar but all constituents were baked together.

Three adult female Cocker Spaniels, produced in our colony and in excellent health, with no parasites, were fed the "new 1944" formula and three similar adult females and one adult male were fed the "old 1943" formula without supplement of any other food. In five days, the youngest female on the new formula had severe fits which continued for five days until the animal's life was in danger. Casein was given during this period but the animal ate very little and had to be calmed with amytal before recovery on stock diet was begun. Another female on this formula was promptly given the casein when the first fit was seen and no more fits occurred although FPF was given for several days.

Within nineteen days, all but 2 of the 7 dogs had had more or less severe convulsions and all lost weight and were very nervous. The "new" and "old" formulas were equally toxic.

Evidently, the protein of the unheated meat meal was either not sufficient in quantity or not high enough in biologic quality to remedy the condition or else some other active toxic constituent was present.

CONCLUSION

The fright disease produced in dogs by certain heated cereal foods may be due to amino-acid deficiencies and not to any toxic substance.

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CLINICAL DATA

Clinical Notes

After a cycle of some seven thousand years we are back where we started. We believe once more in drugs.—*The Scientific Monthly.*

The lamb crop of 1944 was 29,603,000 head, 1,700,000 fewer than in 1943—a drop of 5.5 per cent. The cause is attributed to a decline in the demand for wool and sheep pelts.

A case of tick-borne, pulmonary tularemia in a soldier 28 years old, treated at the O'Reilly General Hospital, U. S. Army, did not respond to either penicillin or sulfadiazine. The case ran the usual course with fever for twenty-six days, despite intramuscular injections of 1,900,000 Oxford units of penicillin from the eighth to the twenty-sixth day.—*Lt. Col. Josey, J.A.M.A., Oct. 21, 1944.*

So-called synthetic thyroproteins are receiving considerable study. These are proteins that have been treated with iodine and contain different quantities of di-iodotyrosine and thyroxine. When about 1/3 ounce per day is fed to a dairy cow, they tend to stimulate milk production and also to increase the percentage of butterfat.

When rock phosphate is defluorinated at a comparatively low temperature the phosphorus is only slightly available when fed to animals, but when a high temperature is used in the defluorinating process the phosphorus is more readily available. This explains the paradoxical situation frequently observed by practitioners during the last three years where a herd shows unmistakable symptoms of phosphorus deficiency while having access to a mineral mixture containing sufficient phosphorus.

The price of penicillin has dropped from $7,000 to less than $300 an ounce during the last twelve months.

Since chemistry has taken over the captaincy of pharmacology, it's stupid to say "the action of drugs". The chemist wants the doctor to say "the reaction of the body to reagents."

Tyrothricin, produced by *Bacillus brevis*, has found extensive use in the treatment of mastitis in cattle, and in topical application in certain human infections. — *American Journal of Public Health.*

Triethylene glycol in concentrations of 1 Gm. to 200,000,000 cc. or more of air is lethal for respiratory pathogens and influenza virus. Monkeys and rats exposed to the treated atmosphere for a year revealed no deleterious effects.—*O. H. Robinson, Associate Referee on Germicides, American Public Health Association.*

Cobalt Deficiency

The discovery of cobalt deficiency as a livestock disease was fortunate for the farmers of this part of Michigan, as I have been able to put many a herd on a paying basis with cobalt. Some years back one of our farmers, whose land contains a sufficient amount of cobalt, bought some of these emaciated cattle which would not eat, gave them a dose of Epsom salt, and they recovered. My predecessor offered him $100 for his formula—Epsom salt. I dispense a great deal of cobalt to my clients; most of them come back for more. Cobalt is blamed for causing mastitis but the fact is that cobalt-deficient cows do not give enough milk to have much mastitis.—*Charles H. Haasjes, Shelby, Mich.*

A Bacteriologic Study of Pullorum Disease in Chickens

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DURING THE 1941 season, a number of farm chicken flocks considered as a possible source of eggs for a hatchery participating with the Maryland Poultry Improvement Board were tested for pullorum disease by the tube agglutination test method at the Live Stock Sanitary Service Laboratory, Centreville, and showed reactors in numbers considerably higher than the 3 per cent maximum tolerance allowed at that time. In some of the flocks in which the incidence of infection was as high as 50 per cent on the initial test, the owner did not care to eliminate the reactors to have the flock eligible for retesting, and withdrew from participation in the testing program. Other flock owners withdrew from the testing program after one or more retests failed to satisfactorily reduce the infection.

The pullorum disease testing program for the hatchery's breeder flocks during the 1940 season had been generally satisfactory, and since the present infected flocks were from chicks supplied by the hatchery, the accuracy of the testing method was questioned. To check the testing method, bacteriologic examinations were made of 43 reactors selected at random from 19 flocks. Included were 9 Barred Plymouth Rock females, 29 New England females and 2 males, and 6 Single Comb White Leghorn females. The 2 males were from a breeding flock maintained by the hatchery.

PROCEDURE

Immediately prior to slaughter for autopsy examination, blood samples were obtained aseptically from the wing vein for inoculation of cultural mediums and for agglutination tests.

Inoculums for cultural purposes were obtained directly from the wing vein, liver, pericardial sac, heart blood, spleen, lungs, pathologic and nonpathologic ova, testes, oviduct, degenerated ova in the peritoneal cavity and oviduct, and partially formed eggs in the oviduct. The ovaries, testes, and degenerated ova were also removed *in toto*, ground with sterile sand in sterile mortars, and cultural mediums inoculated.

Eggs laid prior to or recovered at autopsy were incubated for five days at 37.5 C. before inoculation of cultured mediums with the egg contents. The shell of one, soft-shelled egg in the oviduct was placed in nutrient broth directly from the oviduct.

Nutrient agar slants (Difco) and nutrient broth were used for initial inoculations. Endo agar (Difco) and Levine's eosin methylene blue agar (Difco) were used for purity of cultures when necessary.

Stained preparations were made from colonies resembling those of *Salmonella pullorum*, and if microscopic examination showed morphologically characteristic gram-negative bacilli, transfers were made to dextrose, lactose, sucrose, maltose, and mannite broth. Fermentation reactions in these mediums were used for identification of the isolated bacteria. Stafseth and Corbett's[1] method of identification of *S. pullorum* colonies with immune serum by means of a macroscopic plate test was used as a supplementary procedure.

AGGLUTINATION TESTS

Agglutination of *S. pullorum* antigen in the tube tests dilution of 1:25 was considered a criterion for classification of the bird as a reactor. Four birds showed an incomplete agglutination in this dilution (I 1:25) but were classified as reactors since they were considered a potential source of infection. Titers ranged from I 1:25 to +1:1,600. Cross agglutination of the pullorum antigen with blood serum from three birds infected with *Salmonella gallinarum* occurred in dilutions of I 1:25, +1:25, and I 1:800. (*See* table 1). Blood serum from all of the birds reacted posi-

Presented before the Section on Poultry at the seventy-ninth annual meeting of the American Veterinary Medical Association, Chicago, Illinois, August 24-27, 1942.

From the Maryland State Board of Agriculture, Live Stock Sanitary Service Laboratory, Centreville, Maryland, where this work was done. Dr. Cunningham resigned from his position on August 15, 1942, to become Associate Professor of Poultry Husbandry, Rhode Island State College, Kingston.

tively to stained, rapid whole blood, pullorum antigen.

No correlation was found to exist between the titer of the blood serum in the agglutination tests and the extent of abnormalties present in the ovaries or visceral organs.

AUTOPSY FINDINGS

Gross pathologic lesions of the visceral organs were observed in 33 (76.7%) of the 43 birds.

Liver lesions encountered in 15 (34.9%) of the birds were minute, necrotic foci, atrophy, ecchymoses, hyperemia, cicatrization, fibrinous areas of the serosa and tuberculous areas. Heart lesions in 11 (25.6%) of the birds were pericarditis (thickening of pericardium, excess pericardial fluid, suppuration, and adhesions), epicarditis, hemorrhagic myocarditis, minute necrotic foci of the myocardium, petechiae of the myocardium, and various size nodules of the myocardium. Spleen lesions in 7 (16.3%) of the birds were hypertrophy, ecchymoses, hemangioma, and tuberculous areas. Lesions of the intestines in 21 (48.8%) of the birds were various degrees of enteritis in addition to which 1 bird (2.3%) had tuberculous areas. Internal parasites were found in 8 birds (18.6%), tapeworms in 7 birds, and both tapeworms and roundworms in 1 bird. Miscellaneous lesions in 4 (9.3%) of the birds were: peritonitis, 2 (4.6%), cystic nephrosis, 2 (4.6%), and pancreatitis, 1 (2.3%). (*See* table 3).

Lesions of the ovaries in 27 (65.8%) of the 41 females were degenerated, misshapen, discolored cystic ova which presented a shrunken appearance with turbid, yellow contents of a semiliquid or cheesy material, hemorrhagic ova with a dark brown or greenish brown color, and pedunculated ova. Degenerated ova were found in the peritoneal cavity of 5 females (12.2%) and in the oviduct of 2 females (4.9%). (*See* table 2).

Ovaries of the 41 females were classified on the following pathologic basis: (A) functioning and pathologic, 23 (56.1%); (B) nonfunctioning and pathologic, 4 (9.7%); (C) functioning and nonpathologic, 3 (7.3%); and (D) nonfunctioning and nonpathologic, 11 (26.8%). Pathologic ovaries were found in 27 females (65.8%) and nonpathologic ovaries in 14 (34.1%). (*See* table 3).

BACTERIOLOGIC FINDINGS

S. pullorum was recovered in 42 cultures from the visceral organs and ovaries of 39 birds (dual sources in 3 birds) and in 2 cultures from 41 eggs. *S. gallinarum* was recovered in 3 cultures from the ovaries of 3 birds. Cultures were recovered from either the visceral organs or ovaries of 42 (97.7%) of the 43 birds examined. The bird with bacteriologically sterile visceral organs and ovaries yielded *S. pullorum* from the shell of a partially formed egg in the oviduct. All of the 43 birds were, therefore, considered as infected with these organisms.

Cultural studies did not disclose *S. pullorum* or *S. gallinarum* in the circulatory system since inoculums from the heart blood and wing vein were bacteriologically sterile.

S. pullorum was isolated from the visceral organs of 8 birds (18.6%) as follows: liver, 1 (2.3%); pericardial sac, 6 (13.9%); and spleen, 1 (2.3%).

Infected ovaries were present in 34 birds (82.9%), *S. pullorum*, 31 (75.6%), *S. gallinarum*, 3 (7.3%). Degenerated ova in the peritoneal cavity of 2 birds (4.9%), and in the oviduct of 1 bird (2.4%), and 2 eggs (4.9%) yielded *S. pullorum*.

The incidence of infected ovaries in the pathologic classification was as follows: (A) pathologic and functioning, 20 (86.9%), *S. pullorum*, 18 (78.2%), *S. gallinarium*, 2 (8.7%); (B) pathologic and nonfunctioning, 2 (50.0%), *S. pullorum*, 2; (C) nonpathologic and functioning, 2 (66.6%), *S. pullorum*, 2; and (D) nonpathologic and nonfunctioning, 10 (90.9%), *S. pullorum*, 9 (81.8%), *S. gallinarum*, 1 (9.1%). (*See* table 2).

Of the 41 females, 27 (65.8%) had pathologic ovaries of which 22 (81.5%) were infected, *S. pullorum*, 20 (74.1%), *S. gallinarum*, 2 (7.4%); and 14 (34.1%) had nonpathologic ovaries of which 12 (85.7%) were infected, *S. pullorum*, 11 (78.6%), *S. gallinarum*, 1 (7.1%). (*See* table 2).

Functioning ovaries (*see* table 2) were present in 26 birds (63.4%) of which 22 (84.6%) were infected, *S. pullorum*, 20 (76.9%), and *S. gallinarum*, 2 (7.7%); and 15 birds 36.6%) had nonfunctioning

ovaries of which 12 (80.0%) were infected, *S. pullorum*, 11 (73.3%), *S. gallinarum*, 1 (6.7%).

If infected ova in the peritoneal cavity and oviduct may be interpreted as the result of a primary infection of the ovary, 2 birds from which *S. pullorum* was isolated only from degenerated ova may be added to the 34 birds with infected ovaries and 36 birds (87.8%) could be considered as having infected ovaries.

S. pullorum was not recovered from pathologic livers or spleens, but was recovered from 4 (36.4%) of 11 pathologic pericardial sacs.

S. pullorum was recovered from 2 eggs (4.9%): 1 culture from the shell of a partially formed egg in the oviduct of 1 bird, the only source of infection in this bird, and 1 culture from the yolk of an egg laid by a bird with pathologic ovaries infected with *S. pullorum*.

DISCUSSION

Beach[2] isolated *S. pullorum* from the ovaries of 16 of 18 birds (88.8%), that gave a positive reaction to the first of a series of agglutination tests. Gross ovarian lesions were present in 14 of the birds (77.7%). *S. pullorum* was isolated from the ovaries of birds which did not react to the agglutination test, although ovarian lesions were characteristic of pullorum disease. *S. pullorum* was isolated from the ovaries of birds with no ovarian abnormalities, but which reacted to the agglutination tests. Some adult fowl with abnormal ovaries infected with *S. pullorum* did not always react to an agglutination test. Some adult fowl that reacted to an agglutination test did not react to subsequent tests even though infected with *S. pullorum*.

Biely[3] isolated *S. pullorum* from the ovaries of 44 of 46 birds (95.65%) which proved positive to the agglutination test. All 46 birds showed typical lesions of pullorum disease, thus indicating 100 per cent pullorum disease infection.

Bunyea and Hall[4] isolated *S. pullorum* from the ovaries of 80 per cent of tube agglutination test reactors and from 83 per cent of stained antigen, rapid, whole blood test reactors.

Of the reactors whose ovaries were shown to harbor *S. pullorum*, 75.4 per cent had active ovaries, and 24.6 per cent had inactive ovaries at the time of slaughter.

Of the reactors yielding *S. pullorum* in their ovaries, 11.4 per cent showed no gross pathologic lesions of the ovary. Of all reactors on which autopsies were made, 10

TABLE I—Agglutination Tests

	Titer													
	1:25		1:50		1:100		1:200		1:400		1:800		1:1600	
	I	+	I	+	I	+	I	+	I	+	I	+	I	+
No. Samples	4	8	3	11	4	1	2	5		2		2		1
Total	12		14		5		7		2		2		1	
Per Cent	27.9		32.5		11.6		16.3		4.6		4.6		2.3	

I = Incomplete agglutination.
+ = Complete agglutination.
Cross agglutination with *S. gallinarum* in 3 samples: I 1:25, + 1:25, I 1:800.

Of 2 birds with degenerated ova in the peritoneal cavity, and in the oviduct (table 3) *S. pullorum* in a degenerated ovum in the peritoneal cavity was the only source of infection in 1 bird, and in a degenerated ovum in the oviduct in 1 bird.

Mycobacterium tuberculosis infection was diagnosed microscopically in stained preparations from the liver, spleen, and intestinal tract of one female infected with *S. pullorum*.

The 5 birds with noninfected pathologic ovaries (table 2) yielded *S. pullorum* from the liver, spleen, degenerated ova in the peritoneal cavity, and degenerated ova in the oviduct in 4 of the birds and from the shell of a partially formed egg in the oviduct of 1 bird.

The 2 birds with noninfected nonpathologic ovaries (table 2) yielded *S. pullorum* from the pericardial sac of each bird.

Dual sources of *S. pullorum* occurred in 3 birds with pathologic ovaries in which the ovaries of 2 birds were functioning and nonfunctioning in 1 bird. Cultures were isolated from the ovaries of each bird, and in addition, from the pericardial sac of 2 birds, and from the degenerated ova in the peritoneal cavity of 1 bird.

S. pullorum was recovered only from the pericardial sacs of the two males (table 3).

per cent failed to show gross lesions or the presence of *S. pullorum* in their ovaries. Of all reactors on which autopsies were made, 2.7 per cent had gross pathologic lesions but did not yield *S. pullorum* from their ovaries.

S. pullorum infection was present in some apparently normal ovaries of hens.

Reactors whose ovaries did not yield *S. pullorum* may or may not have had pathologic lesions of the ovary.

Bunyea[5] studied the direct transmission of pullorum disease among adult fowl and isolated *S. pullorum* from the ovaries of 40 per cent of the birds classified as reactors. Bacteriologic examination of "dead-in-shell" chicks, dead baby chicks, and the hens themselves, at autopsy, showed that 26 of the 35 pullorum-disease reactors (74.3%) were harboring pullorum disease, and that 6 of the 12 exposed hens (50%) acquired the disease by associating with the infected group.

Kernkamp[6] studied the transmission of pullorum disease among sexually mature fowl by placing nonreactor birds with reactor birds and blood testing by the tube agglutination test at various intervals in an attempt to determine the spread of the disease. Pathologic and bacteriologic examinations of the birds were made at the termination of the study or at the time of death of individual birds during the study. The study comprised two experiments. In general, experiment 2 was a duplication of experiment 1 but was conducted at a later date, was of nine months duration instead of thirteen months for some birds and fourteen months for other birds in experiment 1, and the blood-test history of the birds was more complete than in experiment 1. In experiment 1 each bird (29 reactors and 24 nonreactors) was tested at the time it was placed in the experiment pen, but in experiment 2 a regular monthly test was conducted on each bird (17 reactors and 17 nonreactors), for a period of twelve months prior to the experiment.

S. pullorum was isolated from 21 (75.8%) of the 29 birds which were reactors at the start of experiment 1 and from 15 (88.2%) of the 17 reactors of experiment 2. The 2 reactors of experiment 2 which were not infected with *S. pullorum* yielded *S. sanguinarum* (*S. gallinarum*) from 1 bird and *S. aertrycke* from the other bird. These 2 birds gave positive pullorum disease blood tests.

Positive agglutination reactions developed during the periods of exposure to reactor birds in 11 (45.8%) of the 24 birds which were nonreactors at the start of experiment 1, 8 (47.0%) of the 17 birds of experiment 2, or 10 (46.3%) of the 41 birds of both experiments. *S. pullorum* was isolated from 5 (45.4%) of the 11 birds in experiment 1, 5 (62.5%) of the 8 birds in experiment 2, or 10 (52.6%) of the 19 birds of both experiments.

Of the nonreactors at the start of the study, 5 (20.8%) of the 24 birds of experiment 1, 5 (29.4%) of the 17 birds of experiment 2, or 10 (24.3%) of the 41 birds of both experiments, were found to be infected with *S. pullorum* at the termination of the study.

The results of this study show that—"pullorum disease *does* spread among sexually mature fowl."

The results of these studies[2, 3, 4, 5, 6] are similar to those reported in this paper in which *S. pullorum* and *S. gallinarum* were isolated from the ovaries and degenerated ova in the peritoneal cavity and oviduct of 87.8 per cent of the birds, all of which were classified as reactors to the tube agglutination test for pullorum disease.

Gross pathologic lesions of the ovaries were present in 65.8 per cent of the birds

TABLE 2—Classification of Ovaries, and Sources of Cultures

	No. Birds	(%) Birds	No. Birds With Infected Ovaries *	†	T	% Birds With Infected Ovaries *	†	T
A) Pathologic, Functioning	23	56.1	18	2	20	78.2	8.7	86.9
B) Pathologic, Nonfunctioning	4	9.7	2		2	50.0		50.0
A, B Total	27	65.8	20	2	22	74.1	7.4	81.5
C) Nonpathologic, Functioning	3	7.3	2		2	66.6		66.6
D) Nonpathologic, Nonfunctioning	11	26.8	9	1	10	81.8	9.1	90.9
C, D Total	14	34.1	11	1	12	78.6	7.1	85.7
A, B, C, D Total	41		31	3	34	75.6	7.3	82.9

* = *S. pullorum* Cultures.
† = *S. gallinarum* Cultures.
T = Total Cultures.

TABLE 3—Distribution of Lesions, and Source of Cultures

	No. Birds	Liver		Heart		Pericardial Sac		Spleen		Intestinal Tract		Miscellaneous		Ovaries		Ova in Peritoneal Cavity		Ova in Oviduct		Egg Shell		Egg Yolk	
		L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C	L	C
Females	41	15	1	10	4	6	1	21		4				27	34	5	2	2	1		1		1
Males	2			1	2	1																	
Total	43	15	1	11	6	7	1	21		4													
Per Cent Total Birds		34.9	2.3	25.6	13.9	16.3	2.3	48.8		9.3													
Per Cent Females														65.8	82.9	12.2	4.9	4.9	2.4		2.4		2.4

L—Lesions
C—Cultures

which was a lower percentage than reported in the other studies.[2, 3, 4, 6] None of these studies reported the presence of gross pathologic lesions or bacteriologic examinations of the visceral organs, whereas the results in this paper showed that gross pathologic lesions of the visceral organs were present in 76.7 per cent of the birds. The heart lesions were the only lesions considered to be specific for pullorum disease. *S. pullorum* was recovered from the visceral organs in 18.6 per cent of the birds. Dual sources of *S. pullorum* in the ovaries and visceral organs occurred in 7.0 per cent of the birds.

Presentation of table 2 and bacteriologic findings to coincide with Bunyea and Hall's[5] data would show that of the reactors whose ovaries were shown to harbor *S. pullorum* and *S. gallinarum* 64.7 per cent had active ovaries (Bunyea and Hall, 75.4%), and 35.3 per cent had inactive ovaries (Bunyea and Hall, 24.6%). Of the reactors yielding *S. pullorum* and *S. gallinarum* from the ovaries, 35.3 per cent showed no gross pathologic lesions of the ovary (Bunyea and Hall, 11.4%). Of all reactors on which autopsies were made, 4.9 per cent failed to show gross lesions or the presence of *S. pullorum* or *S. gallinarum* in their ovaries (Bunyea and Hall, 10%). Of all reactors on which autopsies were made, 12.2 per cent showed gross pathologic lesions but did not yield *S. pullorum* or *S. gallinarum* in their ovaries (Bunyea and Hall, 2.7%). In these birds, however, *S. pullorum* was recovered from other sources. These data do not approximate very closely the data of Bunyea and Hall.

The recovery of *S. gallinarum* from the ovaries of 3 birds was similar to the experience of Beach and Davis[7] and Beaudette[8] who isolated the organism from pathologic ovaries of mature hens and from chicks. The presence of infected pathologic ovaries in the hens was in agreement with the present study in which the ovaries of two infected hens were pathologic and functioning and the ovary of one infected hen was nonpathologic and nonfunctioning. The pathologic ovaries in the birds could not be differentiated from the pathologic ovaries in birds infected with *S. pullorum*. The finding of the fowl typhoid organism in the unabsorbed yolk sac of a chick and in a pathologic ovary of a mature hen

seems to indicate that the chick might have been infected through ovarian transmission of the disease.[8]

Cross agglutination of pullorum antigen with blood serum from birds infected with fowl typhoid could not be differentiated from a pullorum disease reaction. The close serologic relationship of these organisms is an advantage from a practical viewpoint as the pullorum disease blood test would not only detect birds infected with pullorum disease, but would also detect birds infected with fowl typhoid.

Several possible means of transmission of pullorum disease among adult fowl and of flock reinfection are suggested by the results obtained in this study: ovarian transmission through the medium of infected functioning ovaries, recovery of the organism from an egg yolk, elimination of infected degenerated ova from the oviduct, and from the contaminated external surface of an egg shell.

Birds having visceral organs infected with *S. pullorum* but bacteriologically sterile ovaries would not be spreaders of pullorum disease through ovarian transmission. The agglutination test would not distinguish such birds, but all reactors, regardless of the location of the infection, should be removed from the flock.

The recovery of *S. pullorum* from birds having an agglutination titer incomplete at 1:25 would indicate that removal of birds showing reaction in this dilution was desirable in the flock program for the eradication of pullorum disease.

S. pullorum in desiccated ova of the peritoneal cavity produced an agglutination titer without an active infection of the internal organs.

Cultural studies suggested a possible localized source of *S. pullorum* in one ovum without an active infection of the ovary or internal organs and the desirability of supplementary inoculations from eggs for verification of a reactor classification on the basis of agglutination test results.

SUMMARY

Autopsy examinations were made of 43 chickens classified as reactors to the tube test for pullorum disease.

Agglutination titers ranged from incomplete at 1:25 to complete at 1:1,600. Serum from 3 birds infected with *Salmonella gallinarum* cross agglutinated pullorum antigen.

Gross pathologic lesions of either the visceral organs or ovaries were observed in 40 birds (93.0%). Pathologic visceral organs were present in 33 birds (76.7%) and pathologic ovaries in 27 birds (65.8%).

Salmonella pullorum and *S. gallinarum* were recovered either from the visceral organs or ovaries of 42 (97.7%) of the 43 birds examined. The bird with non-infected visceral organs and ovaries yielded *S. pullorum* from the shell of a partially formed egg in the oviduct. All of the 43 birds were, therefore, considered infected.

S. pullorum was recovered from the visceral organs of 8 birds (18.6%), ovaries of 31 birds (75.6%), degenerated ova in the peritoneal cavity of 2 birds (4.9%) and in the oviduct of 1 bird (2.4%) and from 2 eggs (4.9%). *S. gallinarum* was recovered from the ovaries of 3 birds (7.3%).

Ovaries infected with *S. pullorum* or *S. gallinarum* were present in 34 birds (82.9%). If infected degenerated ova in the peritoneal cavity and oviduct may be interpreted as the result of a primary infection of the ovary, 2 birds from which *S. pullorum* was isolated only from such degenerated ova may be included with the 34 birds with infected ovaries and 36 birds (87.8%) could be considered as having had infected ovaries.

Dual sources of *S. pullorum* occurred in 3 birds (7.0%). Cultures were recovered from the ovaries of the birds and, in addition, from the pericardial sac of 2 birds and degenerated ova in the peritoneal cavity of 1 bird.

Pathologic ovaries were present in 27 birds (65.8%) of which 22 (81.5%) yielded either *S. pullorum* or *S. gallinarum*. Nonpathologic ovaries were present in 14 birds (34.1%) of which 12 (85.7%) yielded either *S. pullorum* or *S. gallinarum*.

Functioning ovaries were present in 26 birds (63.4%) of which 22 (84.6%) yielded either *S. pullorum* or *S. gallinarum*. Non-functioning ovaries were present in 15 birds (36.6%) of which 12 (80.0%) yielded either *S. pullorum* or *S. gallinarum*.

Of 41 eggs, 2 (4.9%) yielded *S. pullorum*. Cultural studies did not disclose *S. pul-*

lorum or *S. gallinarum* in the circulatory system.

Mycobacterium tuberculosis infection was diagnosed microscopically in 1 bird infected with *S. pullorum*.

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Doesn't Like Our Hamster

Dr. E. R. Quortrup, in charge of the Beaver River Wildlife Research Station, Brigham, Utah, points out that the hamster pictured in the August issue (p. 92) is a poor specimen of that laboratory rodent, and thoughtfully supplies pictures of the right sort which we cheerfully reproduce herewith. Obviously, the picture used to introduce this none-too-well-known substitute for Cavia spp. is not the variety of Cricetus bred at the Beaver River station. According to our natural history, the name "hamster" is used for several allied types.

Although the little article was not intended to be a naturalist's sketch of an animal, the Doctor thinks the buccal pouches with which the hamster is provided for carrying grain to its nest should have been mentioned, and adds that during World War I people who hoarded food were called "hamsters."

Kennelmaids

FRITZ VOLKMAR, D.V.M.

Chicago, Illinois

THE ITEM, "A New Profession in the Making?" on page 193 in the October, 1944, A.V.M.A. JOURNAL ends with the question: "What do you think?"

May I call your attention to "Hutchinson's Popular and Illustrated Dog Encyclopedia" (3 volumes, Hutchinson & Co., publishers, Ltd., 33-36 Paternoster Row, London, E.C. 4).

There (vol. II, p. 1066, under the heading "Kennelmaids") it is stated:

With the growth in popularity of the dog and its consequential increase in the number of breeding and boarding kennels throughout the country has come the inevitable, enhanced demand for kennelmaids. The demand has been adequately met, as there seems to be no dearth of suitable young ladies to occupy such positions. Quite a number of them enter the vocation for the mere love of being among, and in charge of, dogs, and look upon remuneration as of secondary importance. Those who figure in this category are usually well-educated young ladies having some means of their own (and there are very many of them), who wish to spend their single years in an occupation which they regard as healthy, pleasant, and interesting.

There is the other type of kennelmaid who must of necessity regard the work as her means of livelihood, although it is feared that her salary can seldom be expected to exceed 50s. per week, live in. A girl who is proficient in her work is really worth this figure, but one who has little or no knowledge cannot expect to receive more than about 10s. weekly, live in. Unfortunately, there are very many so-called kennelmaids who are not only inexperienced but absolutely stupid, the services of whom are not worth even fifty pence. They do far more harm than good in a kennel, for if ever there was a wrong way of accomplishing a task they would be sure to find it out. The responsibility of looking after dogs is not a light one, and so many things can happen to cause endless trouble, and there is no room for stupidity or indolence in a kennel establishment.

Many girls are highly competent for the performance of the duties required of them, and they certainly have a greater sympathy, on the whole, with sick or healthy animals than is usually displayed by kennelboys or kennelmen. The owners of dogs which are to be boarded out usually prefer to see women rather than men in charge of the establishment.

Again, on page 1261 (of the same volume) under the heading "Nurses" it is stated:

It is a great fashion among young ladies today to become canine nurses. The demand for them is greater than it ever has been, and certainly the supply is not lagging behind. It is fitting that the gentler sex should be displaying this desire to share in the humanitarian work of attending to sick animals, for not only are they possessed of a greater sympathy towards small animals than is the average youth, but nursing has always seemed to be the peculiar province of ladies.

At the present day, there seems no possibility of a nurse gaining much experience except by serving for a number of months in a veterinary surgeon's hospital where operations and treatments of every kind are being carried out as an everyday routine. Until the animal world has its own diploma-granting nursing institute, the better way for a girl to become proficient in the basic knowledge of her art would be to take the medical nurses' training in the first instance, and, having received a certificate of registration, then to apply her knowledge to the care of animals.

Having done all that, however, it is only fair to warn potential entrants that the salaries obtainable are not at all high. They rarely exceed three guineas per week, at private nursing, and are usually less in fixed employment.

The fact is, it is not a money-making game, and a girl has to be something of an altruist to embark upon it. What impels so many of them to do so is their innate love of dogs and their unquenchable desire to live among them and see them through their terrible illnesses. A very beautiful thought.

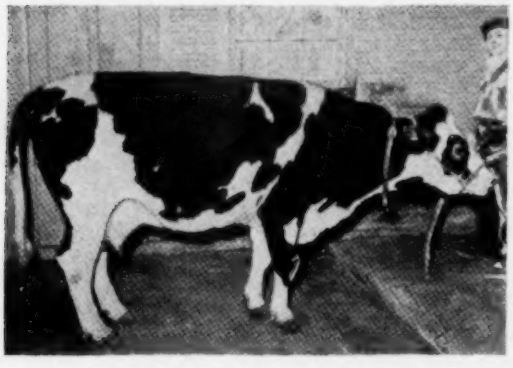
Evidently, "kennelmaid" or "canine nurse" is an established profession in Great Britain judging from the illustrations accompanying the article quoted.

I think, speaking from the experience in my small animal hospital, or rather animal clinic, there is a need for kennelmaids or canine nurses. But whether it "will be offering a luring call to them (girls) in the world of the future" is an entirely different proposition.

In my opinion a grade school girl might be interested in the work, but a high school girl is likely to be more ambitious and a college graduate with a degree in nursing is unlikely to be attracted by the salary of a canine nurse or even that of a graduate assistant, although during the depression I had applications from Ph.D. aspirants for the position of kennelman. I am afraid my limited opinion did not enlighten you much on the possibility of kennelmaid or canine nurse in the United States.

Wintertime Vitamin Deficiencies

Lack of sunlight and the low carotenoid values of winter feeds may be outwardly expressed by two clinically distinguishable diseases in cows closely housed during long winter months. The somatic infirmities of



—*South Dakota Agric. Exper. Sta., 1944*

Cow affected with experimental vitamin D privation. Note stance, founder-like position of hind legs, and distressed countenance.

vitamin D privation, due mainly to lack of sunlight, is manifested by leg stiffness, swollen joints, and difficulty in getting up and down, humped back, loss of flesh, general unthriftiness, low reproduction, and the birth of rickety calves. Moreover, pregnancy, copious milk flow, and the new period of lactation after calving are heavy drains on the vitamin A reserve when not continuously replenished from carotenoid forage. Among the results are: vitamin-A-depleted milk, postpuerperal collapse, and calf infections. Sunlight, yeast, and appropriate mineral and vitamin supplements are the preventives when the feed itself does not answer the purpose.

Scurvy in Cattle

An outbreak of fatal scurvy in a herd of cattle is described by Duncan, Huffman, Mitchell and Hess of Michigan State College (*Journal of Dairy Science*, August, 1944). The clinical picture resembled that of the human disease and blood assays showed low ascorbic acid, hemoglobin, and magnesium values. Thirty-five cows and calves died on one farm. The symptoms described are: loss of flesh; fatigue; interdental, alveolar and gingival lesions; swollen, reddish, and receding gums; erosion of the dental pads; chilitis; rough, dry, scaly skin; subcutaneous hemorrhages, and dryness of the mouth rather than salivation. The disease responded somewhat to the addition of chlorbutanol to the ration.

Use Clear Glass Not Brown Bottles in Milk Fever Treatment

I am less successful in giving intravenous injections out of brown bottles than clear glass ones, especially in dark stables where I cannot see bubbling of air into the bottle as the fluid flows out. The assistant holds the animal's head flat with his knee, and when the rubber tube has been filled he pinches it near the inverted bottle, while I pinch it near the needle. This prevents blood from flowing into the outfit. When the needle has entered the vein, the fluid will flow rapidly and bubble in the bottle as soon as the tube is released. This phenomenon cannot be seen in a dark place if the bottle is brown. When the fluid bubbles one is certain the needle is in the vein, not in the perivascular tissue. After the first rush of the fluid into the vein, the bottle is lowered to slow up the flow, and the bubbles coming more slowly cannot be seen in dim light if the bottle is brown. In bright light this simple precaution is less important.—*Chas. H. Haasjes, D.V.M., Shelby, Mich.*

Pentothal Sloughing

Although not often used subcutaneously in veterinary medicine, pentothal (= thiopentobarbital) solutions are well known to be capable of causing grave irritation, varying from simple hypertrophy to a malignant sloughing that is difficult to heal. This sequel, however, can be prevented by immediate infiltration of the injected place with a 1 per cent solution of procaine in normal salt solution. While the mechanism of the antidotal action is not known, Elder and Harrison* attribute the benefit to the vasodilating effect of procaine which overcomes the ischemia caused by pentothal sodium. The application of heat further establishes vasodilatation.

*Elder, Capt. Charles K., and Harrison, Everett M., Medical Corps, Army of the United States: Pentothal Sodium Slough. J.A.M.A., 125, (May 13, 1944): 116-117.

Equine Encephalomyelitis in 1944

Under date of Oct. 28, 1944, Chief A. W. Miller, U. S. Bureau of Animal Industry, writes a comprehensive report on the encephalomyelitis situation, urging that a watchful eye be kept on the incidence of that disease, even for the late cases which may or may not be due to moldy corn or other intoxications which occur from fall to spring. He urges that specimens of doubtful cases be subjected to laboratory examination. Below is the summary as of October 28:

STATE	REPORTED PRIOR TO 9-29-44	REPORTED AFTER 9-29-44	TOTAL 1-1-44 TO DATE
Ala.	0	0	0
Ariz.	20	10	30
Ark.	0	10	10
Calif.	105	60	165
Colo.	209	39	248
Conn.	0	0	0
Del.	0	0	0
Fla.	19	0	19
Ga.	0	..	0
Idaho	87	30	117
Ill.	107	588	695
Ind.	56	70	126
Iowa	860	692	1552
Kan.	264	646	910
Ky.	1	2	3
La.	65	43	108
Maine	0	..	0
Md.	0	0	0
Mass.	2	0	2
Mich.	37	32	69
Minn.	533	484	1017
Miss.	0	0	0
Mo.	284	1292	1576
Mont.	35	7	42
Neb.	997	436	1433
Nev.	6	0	6
N. H.	1	0	1
N. J.	0	0	0
N. Mex.	21	42	63
N. Y.	0	0	0
N. Car.	5	0	5
N. Dak.	96	26	122
Ohio	0	0	0
Okla.	95	697	792
Ore.	4	0	4
Pa.	0	0	0
R. I.	0	0	0
S. Car.	0	0	0
S. Dak.	231	34	265
Tenn.	0	0	0
Texas	71	192	263
Utah	24	9	33
Vt.	0	0	0
Va.	2	0	2
Wash.	10	2	12
W. Va.	0	0	0
Wis.	24	41	65
Wyo.	41	20	61
Totals	4312	5504	9816

Since our last summary of September 29, reports of 5,504 additional cases have been received. This figure is greater than that for the entire preceding portion of the disease season. It brings the total to 9,816 as of this date. Last reports reaching the Bureau indicate that the flareup which occurred during August and September in several states is now rapidly subsiding.

It is desired that reports from each state be continued as long as the disease persists. Thereafter, formal reports need not be submitted, although it is desirable that the situation be followed closely, even through the winter. Under unusually favorable weather conditions, late cases may occur (*J.A.V.M.A.*, *94*, (1939); 441-442). Generally speaking, cases of equine encephalitis occurring from late fall to spring can be attributed to moldy corn poisoning or other intoxications. It is urged, however, that specimens from doubtful cases be subjected to laboratory examination.

Due to an accident in printing, a few of the October and November JOURNALS contained blank pages. If you received one of these JOURNALS with blank pages, we will consider it a favor if you will write us, and if possible, return the faulty JOURNAL, and we will send you a perfect copy.

Mastitis Control Regulations

The Animal Pathology Department, Michigan State College, hammers home the precise schedule for controlling bovine mastitis in a few well-chosen paragraphs, to wit:

1) Consult your local veterinarian.

2) Test the herd to locate the infected cows. (Physical examination and microscopic test).

3) Dispose of the badly infected cows, detected by physical examination, for slaughter.

4) Segregate infected and suspected cows, detected by laboratory (microscopic test), at one end of the milking line or in another stable until removed from the herd, or recovery as a result of udder infusion.

5) Upon removal of infected cows, clean the stall.

6) Test all replacement cows before purchase or buy them subject to such test (isolate until tested).

7) Procedures must be practiced in raising heifer calves to prevent udder injury and to prevent the sucking that breaks the seal on the teats, if they are to be used as good replacement cows.

8) Stable cows in properly constructed stalls or stanchions with plenty of clean bedding to prevent udder injuries.

9) Employ sanitary measures in the barn at all times:

a) Before milking, wipe the udder of each cow with a clean cloth moistened with chlorine solution (200 p. p. m.).

b) Discard the fore milk into a strip cup.

c) In hand milking, wash hands before milking each cow.

d) Exclude people with "running sores" on their hands or "strep" throats from the milking of cows.

e) In machine milking, dip teat cups into two separate pails of chlorine solution (200-400 p. p. m.) before milking each cow.

f) Do not permit a calf to nurse in the milking line.

g) Use superphosphate or lime on the pavements and platforms.

h) Permit plenty of sunshine to enter the barn.

i) Milk infected cows last and properly dispose of their milk.

10) Proper preventive vaccination may be of value where the infected cows must remain in the herd for sometime. To eradicate the disease from the herd it is necessary to eliminate all infected cows, including those not yet in the advanced stages of mastitis.

Sulfa Drugs Anticoagulant

Biochemists of the USDA have shown that the continuous use (2 to 3 weeks) of sulfadiazine, sulfathiazole, and sulfapyradine regularly produces severe thrombin deficiency when fed to rats at a 1 per cent level in a purified diet. Coagulation time was markedly prolonged and in some instances multiple hemorrhages occurred. The same result was obtained, but to a lesser degree, with sulfaguanidine, sulfanilamide, and sulfathiazole. Quick curative results were obtained by the oral administration of vitamin K, or casein which contains 0.05 micrograms of vitamin K per gram. Neither biotin nor folic acid cured the deficiency.

Symptoms of Botulism in Cows

Although *Bacillus botulinus* may grow in cereal haystacks, this food poisoning is usually due to nutritionally deficient cattle eating carrion (bone chewing) found around the farm. Usually a number of cows are affected, the first ones dying suddenly, as a rule in twenty-four hours. Later, the cases last longer. At the beginning, the heavier milkers are commonly affected. Two to six days usually elapse between the time of ingestion and the appearance of symptoms; the most characteristic of which is paralysis of locomotion and later of deglutition. At first the hind quarters are stiff. Later, the stiffness affects the forelegs also. The victim declines to lie down because of the difficulty in rising. While severe cases refuse feed, the milder ones do not lose their appetite, though, as the disease progresses, they swallow with difficulty, masticate slowly, and dribble from the mouth. The tongue may extrude from paralysis. Loss of condition is rapid. Some cases recover.

C. T. McKenna, D.V. Sc., Government Veterinary Officer: Excerpt from an article titled "Impaction in Dairy Cows," J. Dept. Agric. South Australia, 47, (June 1944): 484-485.

The Toxicity of DDT as an Insecticide

Dr. Paul A. Neal, chief of the research section of the Division of Industrial Hygiene of the Public Health Service, federal security agency, speaking at a meeting of the National Museum Entomological Society of Washington on November 2, reported that in spite of its inherent toxicity, DDT in the desired insecticidal concentrations in air is of such low order that it will not cause injurious effects in humans. He further reported that:

Studies conducted at the Industrial Hygiene Research Laboratory of the National Institute of Health in Bethesda, Md., showed that DDT in concentrations up to 10 per cent in inert powders, for dusting clothes, as in the extermination of lice, offers no serious health consequences. The use of a 1 per cent DDT deobase mist mixture had no toxic effect on rabbits, and it should be safe to use as a fly spray. In a clinical and laboratory study of three men who had had several months of continuous occupational exposure to DDT in its various forms as an insecticide, an evaluation of results failed to indicate any definite toxic effects from exposure to DDT, Dr. Neal explained.

Dr. Neal disclosed that inhalation studies of the toxicity and potential dangers of aerosols, dusting powders, and mists containing DDT had been made at the Industrial Hygiene Laboratory on mice, rats, guinea pigs, dogs, monkeys, and human beings. These experiments revealed a marked difference in the susceptibility of different animal species to DDT. Mice were more susceptible than rats; guinea pigs and rabbits, with monkeys and dogs, were most resistant. Only when relatively large doses were ingested or absorbed through the skin did toxic reactions set in, such as tremors, "jumpiness" as in strychnine poisoning, convulsions with death, fatty degeneration of the liver and kidneys, or changes in the nerve structure.

In experiments with dogs, daily insufflation of 100 mg. of pure DDT per kilogram of the weight of the animal caused definite signs of poisoning in only one out of the three animals tested, after a period of eighteen days.

Although this study deals only with the appraisal of the potential dangers of DDT when inhaled as an aerosol, dust, or mist, Dr. Neal pointed out that massive doses either by mouth or by skin absorption will cause toxic reactions. Heavy contamination of foods should be avoided. Dr. Neal concluded that despite the inherent toxicity, the use of DDT in one to five per cent solutions in 10 per cent cyclohexanone with 85 to 95 per cent Freon, as aerosol, should offer no serious health hazards when used as an insecticide.

The Pathology of Sarcoptic Mange

Sarcoptic mange has been extensively studied, yet the life cycle of Sarcoptes sp. and Notoëdres sp. has never been clarified in the literature. Reliable data on the stages of infectivity are lacking. The genral belief that the adult mite is transferred from part to part by scratching or from host to host by direct or indirect contact is questionable, since this experimental work[1] has shown that the transfer of as few as five larvae or nymphs will develop the disease while the transfer of adult female mites generally gives negative results. In both of these genera, burrowing and tunnelling the skin is a characteristic of the infestation. First and second instar nymphs leave the burrow and make new pockets for themselves, the males burrowing into the tunnels in search of females to fertilize. The adult female seldom, if ever, leaves the tunnel during its life span of 3 or 4 weeks. The life cycle consists of three moults, the first one in four to six days after the nymphs excavate a pocket in the skin, the second in about two weeks after oviposition, the nymphs either leaving the burrow to make new ones or remaining to develop to adult life. Meanwhile, they dig torturous tunnels characteristic of the cutaneous pathology of sarcoptic mange, getting fertilized, laying eggs and nurturing larvae and nymphs, which escape to the surface of the skin to start new pockets and tunnels. In short, the pathology of mange is the story of busy mites excavating winding tunnels in the skin and sending out big families of children to build many new homes for themselves, while the old folks stay at home content to die there. In its

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[1]Gordon, M. R. and Seaton, D. R.: The Development and Transmission of Scabies as Studied in Rodent Infections. Abstract, Rev. Applied Entomol., *32*, (Aug. 1944): 145-146.

way of life, Sarcoptes is magnificent. It keeps the host as busy as itself.

Clinical Observations Concerning Fundamental Nutrition

Modern and up-to-date research has clearly demonstrated that about 25 per cent of the disease of the newborn are due to malnutrition. This fact is definitely true in horses, cattle, swine, sheep, and dogs. The following cases of vitamin deficiencies in cattle and horses have occurred in my practice during the last few months.

1) A purebred Ayrshire bull calf, bred especially for a future herd sire, presented, at birth, symptoms of extreme respiratory distress, anorexia, heart palpitation, edematous legs and joints, and prostration. Five years ago, with drug stimulants, serums of various kinds and mixed bacterins, he would have promptly died. Vitamin A (500,000 units daily), a potent liver extract (3 oz. daily), and injections of vitamin B complex, effected a prompt recovery.

2) In a second case, with exactly the same symptoms and exactly the same treatment, the results were identical.

3) In a Thoroughbred mare suffering from an extreme case of night blindness with symptoms bordering conclusively on periodic ophthalmia, daily injections of 500,000 units of water soluble vitamin A and vitamin B complex effected a most satisfactory recovery in ten days.

Nutritional diseases and vitamin deficiencies are receiving more and more consideration by observing clinicians. It is this writer's opinion that more than 90 per cent of the diseases of livestock are due to malnutrition, poor sanitation, and lack of parasite control. These are three factors that are entirely within the province of the veterinary practitioner to promote for the profit of his client and the benefit of the livestock industry.—*Cassius Way, D. V. M., New York, N. Y.*

Since this report was submitted for publication, the author has treated three animals with typical periodic ophthalmia as described above with complete recovery. These results seem to further indicate that this disease is one of malnutrition.

Wool growers are worrying over the government's wool purchasing program which terminates with the calendar year 1944. They recall the wool situation after the last war, when wool found no market at any price.

Nervous and True Canine Distemper Due to the Same Virus?

Under the title "Nervous Distemper in Dogs—A Pathological and Experimental Study," E. Weston Hurst and coworkers [*Aust. J. Exper. Biol.*, 21, (1943) : 115-126] disagree with the concept that true distemper and nervous distemper of dogs and other susceptible animals are due to separate etiological agents. From a comprehensive study of brain tissue of dogs and ferrets infected with canine distemper virus, they have shown that true canine distemper virus has an affinity for the white matter of the central nervous system and there produces the demyelination, necrosis, and cell inclusions characteristic of so-called nervous distemper. During the acute stage of canine distemper, the meningeal barrier blocks the admission of virus and antibodies and thus delays the appearance of nervous phenomena during that stage. Cross immunity between nervous and true canine distemper virus was demonstrated, and the infection caused by virus of brain origin was indistinguishable from that of true distemper.—*From an abstract in the Veterinary Record, Aug. 19, 1944.*

New, Nonirritating Insect Spray

The Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, has perfected an odorless, nonirritating pyrethrum extractive that is deadly to household pests (flies, fleas, bedbugs, cockroaches, ants, mosquitoes, dog tick). It is used in the spraying device such as the aerosol bomb, the device invented by the U. S. Department of Agriculture for wartime control of mosquitoes.

This unnamed insecticide is made by extracting pyrethrins (90 to 100 % pure) from the impure pyrethrum extracts with nitromethane which, when distilled off, leaves practically pure pyrethrins minus the irritating residue.

The aerosol sprayer is a handy can dispenser that holds a liquefied gas such as is now used in home refrigerators. When a valve in the can is opened, a foglike spray deadly to insects is emitted. The new spray has been thoroughly tested, the announcement asserts. Commercial production awaits the coming of V-Day.

SURGERY & OBSTETRICS
AND PROBLEMS OF BREEDING

The Uterine Wall of the Cow

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Cheyenne, Wyoming

FOR THOSE who can interpret the signs, there is written in the uterine wall the story of how the sperm, ovum, embryo, and fetus are accommodated, conserved, nourished, and born. There is also recorded the causes of failure and death of these bodies. The characters in which this story is written are not letters, words, and phrases, but cells, fluids, tissues, and reactions. Some of the signs are macroscopic and clinical, such as redness, heat, pain, and swelling. Others are microscopic, such as changes in epithelial cells, connective tissue cells, and leucocytes and glands.

The objective herein is: (1) to discuss the physiologic phenomena that are prerequisite to an understanding of those changes that take place in the uterine wall during quiescence and estrum, and in preparation for processes leading up to gestation and parturition; (2) a study of the architecture of the uterine wall with particular emphasis upon those fluids, cells, and tissues which achieve: (a) the prevention of invasion of microörganisms, and (b) the repair of injury to the uterine wall (chart 1).

The cross section of the uterine wall of the cow shows about the same construction that is found in other species, that is, first, the endometrium; second, the vascular bed; third, the muscles; and fourth, the serous coat. The subdivisions of the endometrium are as follows: epithelial layer, 1.1; lamina propria, 1.2; compacta, 1.3; and spongiosa, 1.4; making up what is called the functionalis, and on the bottom of the endometrium lies the basalis, 1.5. This establishes a routine procedure that conforms with studies conducted upon other species. Beneath the endometrium and between the circular and longitudinal muscle layers is the vascular bed (layer 3, chart 1).

The incentive for studying the uterine wall is stimulated by the importance of its functions, and its exceptionally versatile properties.

It forms the tube and secretes the mucus that aids in the transportation of the sperm to the ovum and the return trip of the fertilized ovum to the uterine horn. It develops a matrix of itself for the nesting of the fertilized ovum. It provides nutrition and respiration for the developing fetus. It governs the length of time the fetus can remain inside the mother. It receives and reacts to endocrine and nervous messages from the brain and ovary. It is, therefore, one link in the endocrine chain. It takes part in the storage, and perhaps the manufacture, of endocrines. Its handling of fluids—blood and lymph—is miraculous. It possesses a reparative system that makes temporary and permanent repairs, and later erases much of the evidence of the damage that has been sustained by injurious agents.

An understanding of the uterine wall is prerequisite to the solution of such problems as abortion, retained fetal membranes, and infertility. Each is a definite challenge to the clinician. In spite of the fact that these problems have been studied and treated and handled for years, little is actually known about them.

Following the example set by mathematicians, chemists, and other scientists, who

Reprinted from the American Journal of Veterinary Research [vol. 5, (July, 1944)].

depend upon fundamental formulas for the solution of specific problems, the gynecologist has at hand an endocrine-relation system that presents a formula for the solution of certain kinds of infertility. Chart 2 is a diagrammatic representation of an endocrine formula. It shows the course of some of the most important endocrine products, especially those responsible for estrum, nidation, placentation, and nutrition of the fetus. Much of our knowledge of endocrine influence upon the genital tract is derived from small animal experimentation and from studies of the genital tract of the human subject. It is essential that we understand and take advantage of those fundamental steps. However, the species difference makes the task of correlation a difficult one, and one must not attempt to make literal comparisons since the human uterus is decidual and the bovine adecidual.

Let us study some of these endocrine influences in order to refresh our memories and make the rest of the paper more understandable. The pituitary gland secretes a follicle stimulating hormone and a lutein stimulating hormone. The physiologic mature ovary accepts this endocrine stimulation and in its turn secretes hormones that act upon the uterus. The first of these is produced by the follicle and goes by a number of names, estrin, folliculin, theelin, and synthetic diethylstilbestrol. The second hormone comes from the corpus luteum and is called progesterone. The response of the uterus to these two hormones can be divided into phases or stages called the follicular and luteal reactions.

A marked differentiation between the histologic changes produced by estrogenic substances and the phenomena that result from the luteal stimulation have not been,

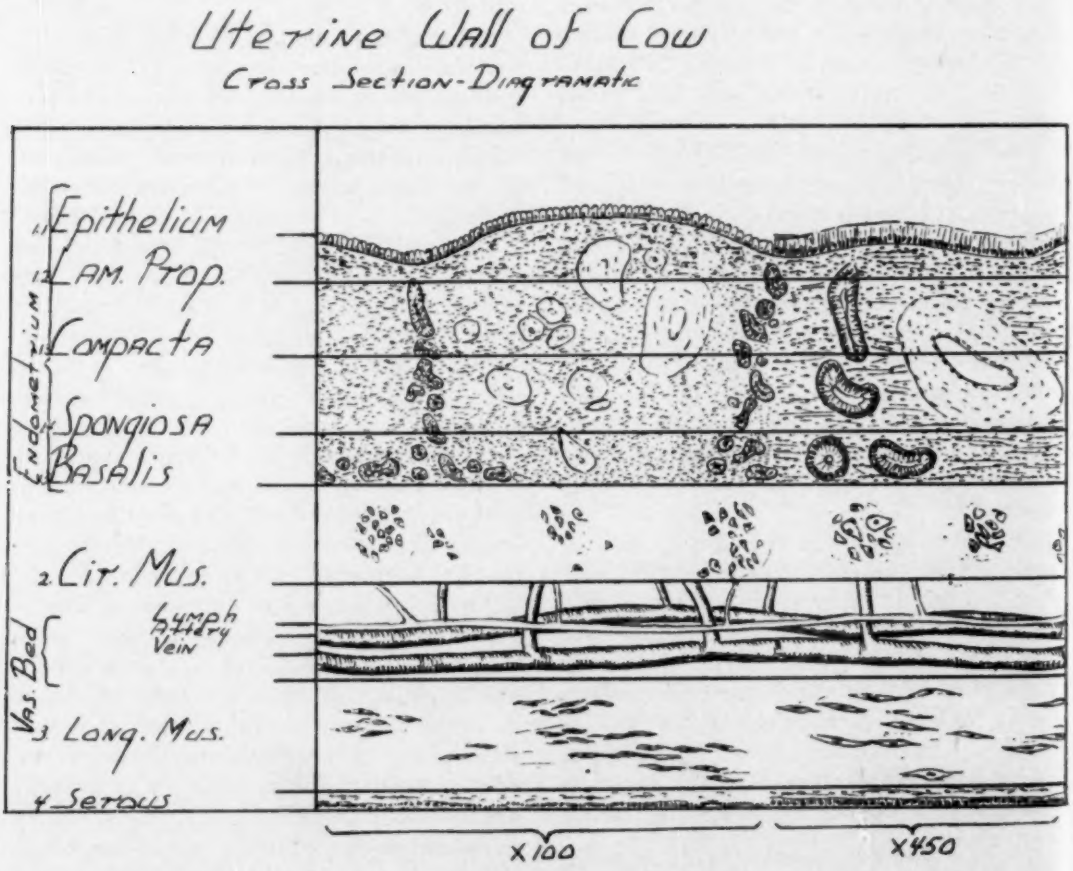


Chart 1

and perhaps cannot be, clearly defined in the endometrium of the cow. I think that we should not expect a well-defined differentiation in an adecidual uterus. Certainly, we should not expect to find the proliferative thickening of the endometrium as it occurs in the human subject, later to be desquamated. True menstruation does not take place in the cow. The estrogenic phase has no definite limitations. It is characterized by a vascularization and edema of the endometrium, and this acute reaction or congestion merges into what we may call the luteal or progesteronic phase where the glands become more tortuous and the area more congested and the cytoplasm of the glands higher. At this time, the cytoplasm throws out threadlike projections into the lumen of the gland. The gland, therefore, takes on what may be termed a secretory phase. If gestation ensues and the fetal membranes become attached to the endometrium, the situation is an entirely different one from that encountered in the types of uteri in which a diffuse attachment takes place. In the case of the cow, the attachment takes place in those areas which we call caruncular areas which consist of blood vessels terminating at the apex of a small rounded elevation. This later develops into a complicated organ known as a cotyledon and a placenta. During gestation, the epithelium of the intercotyledonous area becomes diminutive in height, the nucleus is small, and there is a single layer of cells instead of the piling-up of cells that is found in the nongravid uterus. The glands themselves become greatly distended and they too are lined by a single layer of cells. There is no evidence of a secretion of mucus at this time. The lamina propria becomes thin, as does the rest of the uterine wall.

For the moment, I should like to return to a study of the surface of the uterus and a discussion of the mucus in which it is bathed. The defense of the uterine wall against bacterial invaders and the repair of the tissues following injury begins with mucus. This is true of all mucous membranes, but in no instance does it accomplish more phenomenal results than in the case of the uterus. Immediately following attack by an irritant, mucus is produced in large amounts. At first, it is thin and watery. It mechanically removes bacteria by lavage of the surface. Then it becomes thicker and viscous, immobilizing organisms, covering the epithelial layer with a gelatinous coat, thereby giving the epithelial cells a chance to multiply and perform their reparative duties. The mucus becomes a medium for sera, and a vehicle in which leucocytes attack and finally a means for carrying bacteria and débris from the body. Mucus is of great clinical significance since its physical properties are characteristic of the state of health or disease of the tissues that lie beneath it. It tells the story of the kind, degree, and time that certain reactions in the uterine wall have occurred, and whether these reactions have been physiologic or pathologic. Therefore, it becomes important, though sometimes difficult, to differentiate between physiologic and pathologic phenomena. It is not the intention to deal with the character of uterine mucus under all conditions, but to call attention to the fact that it is a part of the uterine wall and that, perhaps, it is of greater clinical value than all the other factors taken together.

I am led to believe that uterine mucus always harbors macerating epithelial cells. At all times, there is just enough mucus to moisten the surface and make it glisten. Mucus in itself is moderately bacteriocidal and it provides a medium where the phagocytic agents can meet and conquer invading organisms. Turbid mucus is not pathognomonic of endometritis.

Up to this time, we have been describing the uterus and not including the cervix and its secretions. The cervix remains closed by mucus even during estrum and although the uterus is flushed by increased granular activity, I doubt whether any of the fluid of the nongravid uterus escapes through the cervix. Following parturition, the surface is thoroughly bathed and cleansed by the secretion of mucus that carries with it disintegrating blood clots and membranous débris. It terminates by a flow of chocolate colored or yellow mucus from the puerperal

uterus, and is termed lochia. It embodies nature's most efficient method of cleansing and repairing the changes sustained by the uterus during gestation. Therefore, for the fear of doing more harm than good, one should hesitate about interfering with this natural defensive factor and be very cautious about the use of antiseptics or other so-called remedial agents.

Immediately beneath the thin coat of mucus lies the epithelium, the defensive properties of which are phenomenal. We are familiar with this protective sheet of epithelial cells and its effectiveness as a barrier to invasion in many parts of the body. The part it plays in the uterine wall is no exception. Old cells are being constantly replaced by new ones. They continually change in shape and size under the influence of estrin and progesterone. Epithelium can perform its multitudinous duties only in the presence of an adequate provision of vitamins A, C, and E, and perhaps others.

Beneath the epithelium, the connective tissue cells of the basement membrane and the lamina propria take over the secondary defense. I can think of no place in the body in which the defense is more effective and the repair more complete than in the case of the lamina propria. The density of connective tissue cells is greatest in the area immediately beneath the epithelium. Beneath the lamina propria, the connective tissue cells are less numerous and still deeper in the "functionalis" they permit the accumulation of fluid and allow space for cyclic changes in the glands. This zone is so loose in comparison to the superficial layers that it is called spongiosa. It forms a bed of connective tissue cells and intercellular substance, collagen, the integrity of which is dependent upon the presence of adequate amounts of vitamin C. It is evident that any deficiency in health of the spongiosa would be reflected in the vitality of other tissues, especially the epithelium. Macroscopically and microscopically, a strenuous effort is being made to examine the "functionalis" and to interpret the picture it presents. The cyclic changes in the uterine wall of the human uterus have been studied thoroughly, and there is a uniformity of opinion among pathologists in regard to the microscopic pictures and the endocrine secretions that produce them. Gynecologists make valuable use of the microscopic picture of the human endometrium, and biopsy is a routine measure.

The hormones produced by the human subject and by lower animals are the same, but the responses on the part of the uterine wall are comparable but not parallel. Any effort to make direct analogies is doomed to disappointment. Unfortunately, the veterinarian is denied access to many of the measures that are routine procedures in human practice. The problems confronting the veterinarian are difficult and progress is slow, but we propose to improve our position by hard work and by taking advantage of the contributions made in the fields of experimentation and texts written for the human subject. Just how much attention the clinicians should give to the microscopic picture may be controversial. It is admitted that it is not essential that one should know the details of one's watch and all the intricate mechanisms and correlations of wheels and bearings in order to tell the time of day, but the man who repairs the watch must know. This is the difference between the clinician and the layman, except that the uterine wall is much more difficult to understand than the most delicate timepiece.

The uterus adapts itself quickly to the changes of pregnancy; it survives the trials of parturition, and repairs the damage of separation of fetal membranes and the injury that comes from bacterial or traumatic insult. The connective tissue as well as the epithelial defense of the uterine wall is complemented by a leucocytic invasion of mobile cells that wander about the lymph spaces and take care of invaders that may have penetrated epithelial and connective tissue barriers.

The defense of the uterine wall can not be discussed without appreciation of the part played by the vascular bed. It seems to me that this has been neglected by our pathologists. However, clinicians have

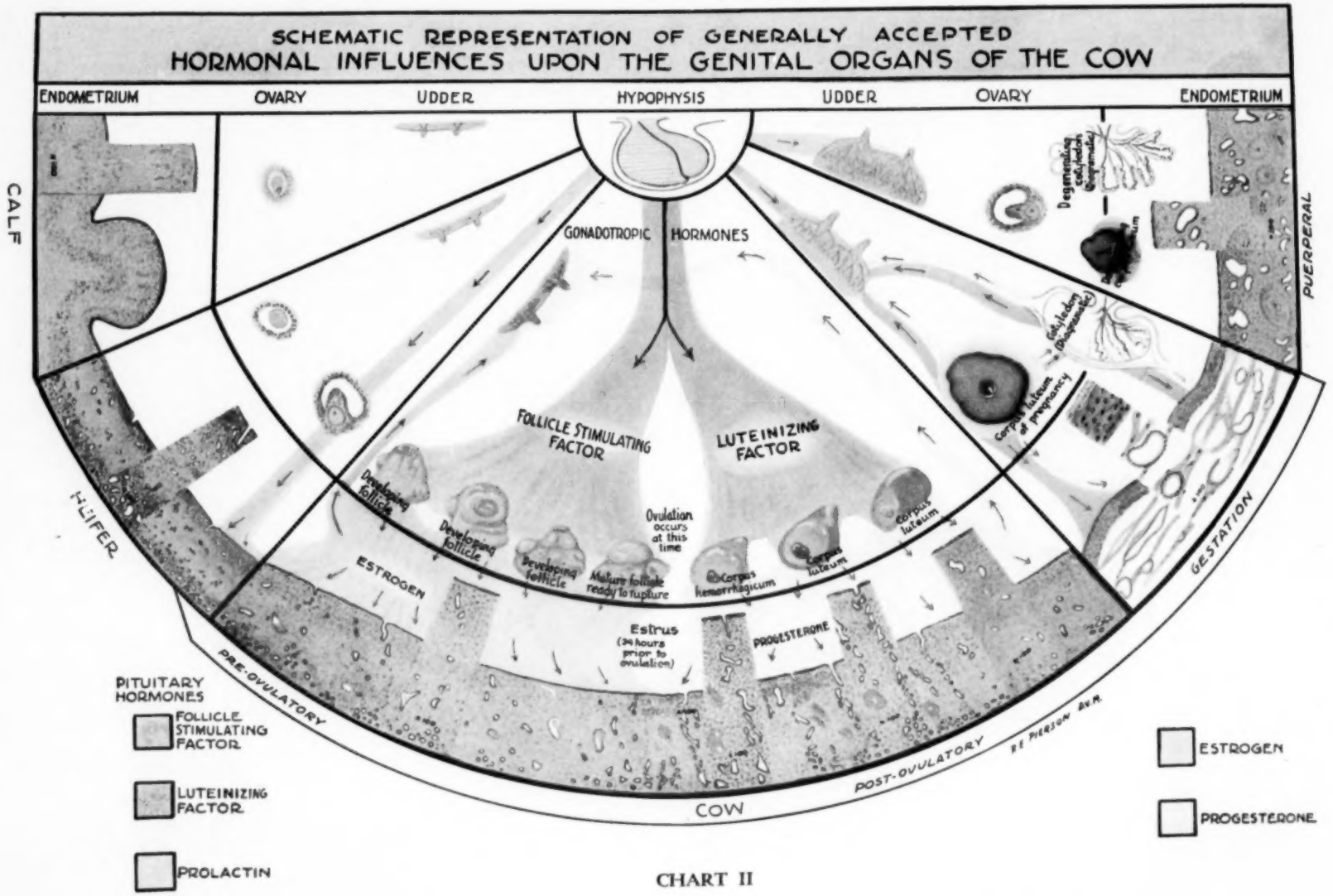

SCHEMATIC REPRESENTATION OF GENERALLY ACCEPTED
HORMONAL INFLUENCES UPON THE GENITAL ORGANS OF THE COW
ENDOMETRIUM
OVARY
UDDER
HYPOPHYSIS
UDDER
OVARY
ENDOMETRIUM
CALF
HEIFER
PUERPERAL
GESTATION
GONADOTROPIC HORMONES
FOLLICLE STIMULATING FACTOR
LUTEINIZING FACTOR
Developing follicle
Developing follicle
Developing follicle
Mature follicle ready to rupture
Ovulation occurs at this time
Corpus hemorrhagicum
Corpus luteum
Corpus luteum
Corpus luteum of pregnancy
Degenerating calcification
ESTROGEN
Estrus (24 hours prior to ovulation)
PROGESTERONE
PRE-OVULATORY
POST-OVULATORY
COW
PITUITARY HORMONES
FOLLICLE STIMULATING FACTOR
LUTEINIZING FACTOR
PROLACTIN
ESTROGEN
PROGESTERONE

CHART II

learned much about its significance. In addition to handling the flow of blood and lymph confined to vessel walls, it forms a veritable reservoir for extravascular fluids—sometimes physiologic and sometimes pathologic. An indication of the load that the vascular bed is carrying is reflected in the external genitalia since the vulva and vagina also serve as reservoirs for the overflow of fluids that can not be stored, even temporarily, in the vascular bed of the uterine wall.

The clinician differentiates very carefully between the edema of approaching parturition and the edema of fulminating septicemia. An error in judgment here means the difference between life and death. Further discussion of those delicate problems must be delegated to the chapter upon diseases of the puerperal uterus. The muscles play an important rôle in the defense of the uterine wall. It is the well-known strategic move on the part of the militarists to shorten their lines. In the case of the uterine wall, this defensive strategy is accomplished by the muscular layers. The muscle reduces the vulnerable surface of the uterine wall from feet to inches. It expresses excessive fluids from the lumen of the uterus and performs many functions that we have not space to discuss. It is directly under the stimulating influence of the estrogens and pituitrin and the inhibitory actions of progesterone.

The serous coat is the last wall of defense and performs its duties in much the same way as the epithelial layer.

It must not be forgotten that the endocrine influences are also defensive in their action. This is particularly true of the estrogenic substances. They stimulate the glands into action and constitute the principal factor in bringing about muscular contraction. Their therapeutic use is not thoroughly appreciated by the veterinary profession. We are not familiar with its value in the uterine inertia, or just when and how to use it. I suspect that ingestion of fetal membranes by the cow may be beneficial rather than harmful because of the estrogen and possibly the vitamin C content of those membranes. Estrogenic products have been used successfully in the evacuation of the uterus in missed abortions.

The excessive action of estrogens causes endometrial glandular hyperplasia as is seen in the case of nymphomania. It is of intense interest that the reaction on the part of the uterus to estrin, and perhaps progesterone, resembles the initial phases of inflammation: congestion, leucocytic infiltration, diapedesis, and edema, followed by repair. It requires no stretch of the imagination to suspect that estrin and progesterone are proving to be valuable therapeutic agents. The gynecologist in human practice is finding uses that probably will not apply to lower animals, but from the standpoint of promoting the defensive and reparatory powers of the uterus, we can have great hopes.

Based upon its physiologic action, the estrin group of therapeutic agents will be of value in certain kinds of endometritis, retained placenta, and endometrial hypoplasia. Its usefulness will grow as the clinician becomes more and more familiar with the things that take place in the uterine wall.

Estrin is on the market in the form of theelin, folliculin, stilbestrol, and many other agents. We know little of its indications and dosage.

This paper deals briefly with a number of problems relating to reproduction in the cow. It makes no pretense to finality. I feel that progress is being made and that sufficient work has been done to warrant reporting. It is hoped that it will stimulate discussion and a greater effort on the part of all of us.

Says the book reviewer of *Brucellosis in Man and Animals* by I. Forest Huddleson in the *American Journal of Public Health:* "It is fitting and fortunate that this book should have as its author a veterinarian, an investigator recognized internationally as an authority on this subject."

The training of war dogs to locate anti-tank mines and booby traps is a closely guarded secret. M-dogs, as they are called, are said to have located many a death-dealing device in Normandy.

Local Use of Penicillin

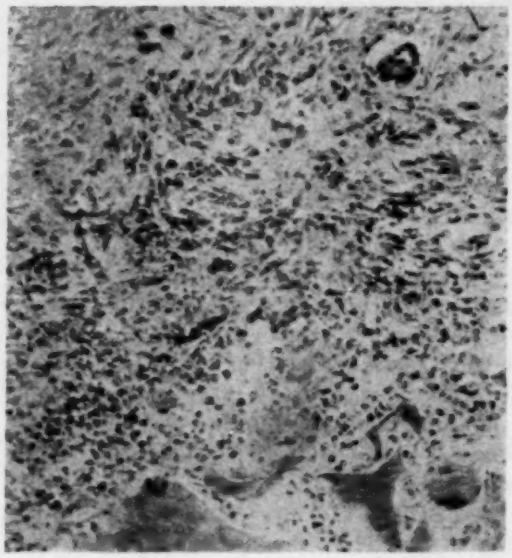
There are a number of conditions in which it appears advisable to use penicillin locally, either in conjunction with systemic therapy or by itself. . . Penicillin may be injected into empyemic cavities and injected into joints into which its passage from the blood is usually quite limited. High local concentrations probably aid in causing disappearance of the infecting organisms but will not necessarily render surgical drainage unnecessary. . . Concentrations of 50 to 250 cc. may be used.—*From Annals of Surgery.*

In view of the many instances of infected articulations in animals, where prompt disposal of the infecting flora is life-saving, penicillin in that rôle would be a useful drug, indeed, in veterinary medicine. Like the sulfonamides, it must be used with, not to the exclusion of, refined surgical techniques. The routine use of penicillin in veterinary practice is eagerly awaited.

Hemostasis with Absorbable Gauze (= Oxidized Cellulose)[1]

A gauze, hemostatic and absorbable, which should be extremely useful in animal surgery, is described in *Annals of Surgery* for August. The trials were conducted by the Committee on Medical Research, Columbia University, on cats and dogs and a sizable number of human patients in connection with various operations described. The gauze was supplied by the Eastman Kodak Company through Parke, Davis & Company, patentee of the new product.

Oxidized cellulose has the property of expanding in the wound and of remainng compatible with the comfort and integrity of the tissues. Though retaining a small quantity of formaldehyde, used in its sterilization, it is nonirritating. In swelling, it fills every recess of the wound's wall, taking the place of clots and in due but variable time, it is absorbed. It is used in open or sutured wounds in the body cavities, *par excellence,* for packing the cavity of a nephrectomy, splenectomy, aneurysms, cholecystectomy, and should be a choice dressing for the many cavities made in the musculature of animals. The hemorrhage following the removal of ordinary gauze is avoided. In twenty-four hours, oxidized cellulose, is friable and if necessary it can be teased off without causing bleeding.



—*From Annals of Surgery*

Photomicrograph showing particles of oxidized cellulose in a kidney 30 days after packing. Slight reduction.

Though not irritating, this gauze, being a foreign body, should be used in as small amounts as possible and never to the exclusion of meticulous surgery. The possible advantage of impregnating the gauze with germicides remains to be tried. It seems to be incompatible with penicillin. Combining with thrombin is not necessary. Its hemostatic properties are sufficient. Healing by first intention is not interrupted.

Twenty-one firms, representing a private investment of $20,000,000, met with the War Production Board to discuss the penicillin situation (*International Digest,* Sept. '44). The discussion disclosed that the total production was 1.7 lb. daily. Although that is 100 times more than ten months ago, the amount is sufficient to treat only 1,500 patients a day. The producers were alarmed at the false hopes and the absurd claims promulgated by the news magazines.

[1]Frantz, Virginia Kneeland, M.D., Clarke, Hans T., D.Sc., and Lattes, Raffaele, M.D.: Hemostasis with Absorbable Gauze (Oxidized Cellulose), Departments of Surgery and Biochemistry, College of Physicians and Surgeons, Columbia University, N. Y. Annals of Surgery, *120,* (Aug. 1944): 181-197.

Parturition Decreases Plasma Carotene

Data obtained from 63 parturition records in 30 Jersey cows showed that there was a decrease of carotene values in 52 instances, an increase in 9, and no change in 2. The average carotene values were 169 micrograms per 100 cc. of plasma before calving and 134 micrograms after calving, or an average decrease of 21 per cent. Grouped as to carotene intake of individual cows before and after calving, the results showed general decline in plasma carotene. The decrease was directly related to the amount present before parturition. In cows having plasma carotene values as low as 70 to 72 micrograms per 100 cc. of plasma, the decrease was less than 2 per cent, but ran as high as 30 per cent in cows having 200 or more micrograms per 100 cc. of plasma. Lactation, absorption or storage, or more efficient conversion of carotene may be accountable for the decrease. In any event, there is a rather definite relationship between plasma carotene after calving and the carotene content of butterfat. When butterfat carotene was 0.88, 1.51, 2.90, and 3.32 micrograms per gram of fat on the fifth day after calving, the plasma carotene was, respectively, 67, 114, 174, and 262 micrograms per cubic centimeter of plasma. The relation of these decreases to postpartum disease is not mentioned.—*A. H. Kuhlman and W. D. Gallup, Oklahoma A. & M. College, J. Dairy Sci. 27, (1944): 633-634.*

Streamlined Oöphorectomy Canis

I am so used to spaying bitches alone that it seems an assistant is surplus baggage. A dose of morphine, 3 to 5 grains (according to size of dog), is injected hypodermically and half an hour later the bitch is put on the table, head down, and an ether cone clapped to the nose and held in place with the right knee. Meanwhile, I scrub things up and do the operation. The horns are picked up with a pair of nickel-plated Russian forceps which I bought at a grocery many years ago for 10 cents. The ovaries are removed by torsion, or ligated and snipped off. Four through and through interrupted sutures of linen, one inch away from the edge of the incision, are inserted in the skin and laid on each side, while the lips of the wound are closed tight with a continuous 20-day catgut, covering the incision twice. The linen sutures are then tied loosely enough to admit the index finger under them. When the bitch is on her feet they are tighter and in twenty-four hours the tension is just right, owing to tissue reaction. The linen sutures are never left in longer than three days; in a 3-month-old pup, only twenty-four hours. The wound never causes any trouble because of the liberal dose of morphine the dog receives, which keeps her quiet for twenty-four hours. In my method of suturing, there is no interference with the blood circulation, and in twenty-four years only one bitch tore out the stitches and only one developed a hernia later at the operative area.—*C. H. Haasjes, D.V.M., Shelby, Mich.*

Improving the Quality of Meat

Breeding, caring for, and feeding meat-producing animals with the view of improving the nutritive properties of their meat is one of the projects of the Research Administration of the USDA. That the flesh of cattle, hogs, and sheep on the market varies in physical and chemical composition, nutritive value, appearance, and palatability is well known in the meat-inspection branch of veterinary medicine. In one study carried out by O. G. Hankins, meat research specialist of the Department, meat from the same steers, for example, varied as much as 12 per cent in moisture, 23 per cent in fat, 14 per cent in protein, and 7 per cent in ash. The differences were ascribed to the influence of breeding, exercise, age, and feeding. The study showed that while tenderness generally decreases as an animal gets older, it is not always true that the meat of a young animal is tender and of an old one tough. A main objective is to breed animals for meat of superior quality, not for physical types that please the eye.—*Excerpt for USDA release, Oct. 12, 1944.*

We hardly began to catalogue shock among postoperative tragedies, until along came the studies of dicumarol to remind us of the thromboses and embolisms of accidental and surgical injury. A lot of things are more unobservable than rare.

The circulation of the JOURNAL is flirting close to the 10,000 mark, and still mounting —an all-time high record for a veterinary journal.

NUTRITION

MATERIAL FURNISHED BY THE COMMITTEE ON NUTRITION

Nutrition in Clinical Medicine

Nutrition in clinical medicine, or feeding of the sick, is a branch of learning distinct from nourishing the normal organism. It has knowns, unknowns, and unobservables not touched upon in the study of nutrition. In the sick, the vital function called nutrition may be, and generally is, interrupted to a dangerous degree down the long chain of processes involving intake, digestion, absorption, circulation, and final disposal of nutritive material. In health, nutrition is physiology; in illness, it cannot be separated from pathology.

The experienced clinician need not be reminded that the well-nourished survive disease to which the malnourished succumb. In the presence of the sick, his first concern is prior regimen and the last step of his visit is the directive for subsequent feeding. Indicting the practitioner of indifference to nutrition, or ignorance thereof, stems from inexperience in the field of practice. The experienced clinician is keen about nutrition but is constantly frustrated because, even in health, nutrition is not an exact science. In veterinary medicine, nutrition for the sick is an untouched science and, therefore, a bewildering art. Far be it from the veterinarian not to put facts to work as soon as they come to light. It's habitual to pounce eagerly upon usable facts in clinical work. But, while the nutritionist has been able to enrich the fund of scientific knowledge for the normal organism, the entrance wedge of nutrition for the sick has yet to be driven. Empirical teaching based upon experience is the only guide for the feeding of the sick animal, notwithstanding that during the bout with disease the clinician is constantly faced with a starving patient.

Lusk (*The Science of Nutrition*, 1928) defined starvation as deprivation of any or all of the *interdependent* elements an organism requires for nourishment, and he named water, minerals, protein, carbohydrates, fat, and vitamins as the ambit of that category. The nutrition of the sick is, therefore, the prevention of starvation. In other words, supplying the elements which depend upon one another to maintain the nutritive balance and managing their delivery to the place of utilization is a manifestly intricate matter; and what of anorexia, refusal to drink, inability to digest, blocked absorption, low metabolic rate, and faulty catabolism and elimination? In addition to knowledge of the normal requirements of the healthy so far as is known, the doctor has these to contend with, and he lacks the yardstick to measure them. "What is the nutritionist in the veterinary field doing about this?" is a reasonable question to ask. Between the slow death from a vitamin deficiency to the rapid death from thirst are the intermediate states of starvation facing the practitioner—and in the absence of scientific directives.

In the main, protein and mineral elements account for *bulk* (loss of flesh), carbohydrates and fat for *energy* (weakness), and vitamins for *function* (motion). For practical purposes, water may be set apart as the "enabling agency" and, therefore, as the most significant. How to maintain these to the best advantage of the sick makes up a lot of unanswered questions—in short, an untouched branch of veterinary medicine. The acute starvation of complete deprivation is one thing, the slow starvation of illness is another. What is the best protein for the tissues and plasma, the best source of calories, and the right catalysts (vitamins) for the diversified upsets of given diseases is probably asking too much in the light of present knowledge, but that is precisely what the clinician wants to know. His sole guidance now is experience and the chapters on feeds and feeding written for the layman. Dietetics for veterinary medicine, as distinguished from nutrition for animal husbandry, is a branch of scientific knowledge yet to be mapped out.

The best formulas of the nutritionists, like the whims of the herdsmen, do not always fulfill the nutritional requirements of the sick and may even prove detrimental. Anorexia, combustibility of fat, and lowered metabolism, which come to the rescue of the ailing body, challenge the therapist to replace them through palliative nourishment. If the problem of feeding the sick animal (as a science) is not insuperable, it should be taken along with the development of nutrition for the healthy.

For practical purposes, feedstuffs over 1 year old should be considered devoid of pro-vitamin A carotenoids.

The main source of vitamin A is shark-liver oil. Other fish that yield sizeable amounts are halibut, tuna, bass, and cod.—*WPB, Oct. 6, 1944.*

The quality of hay depends mostly on its carotene content. Its carotene value is associated with green color in fresh hay, but color cannot be relied upon to judge hay 1 or more years old.

The superior feeding value of animal protein supplements over vegetable protein supplements does not lie entirely in the protein portion as was formerly believed, but is largely due to the B vitamins and minerals that are ordinarily present in animal protein.

The production of animal feed is constantly undergoing changes that must be taken into consideration when formulating feed mixtures for both well and sick animals. Until recent years tankage included most, if not all, of the offals of edible carcasses, while at the present time many of the glandular products are removed and used for therapeutic purposes, thus reducing its feed value.

The feeding of ruminants is comparable to the feeding of a fermentation vat, which accounts for their ability to utilize efficiently low grade forage and low grade protein. The rumen contains billions of bacteria and protozoa which act in harmony for the benefit of the host. The bacteria multiply rapidly while splitting the cellulose and other feedstuffs in the rumen; they are then consumed by the protozoa, which in turn are digested by the animal and serve as a valuable source of high quality protein. Also, in this fermentation process the B vitamins are synthesized.

Rickey Again Makes the Headlines

—From Winthrop Chemical Company

Admiral Byrd's Renowned Dog, Rickey, Aged 10 Years

Admiral Richard Byrd's dog, Rickey, of Antarctic fame, now 10 years old, again made the headlines while basking at the naval air station at Lake City, Fla., when he was stricken with filariasis and reported cured with Fuadin, named for King Fuad of Egypt, and obviously used for parenteral parasitism in man for centuries. The romance of the event, however, lies in the fact that Rickey was born under the ice in Little America in 1934, and made a second trip there with another of the Admiral's historic expeditions. Rickey is an Eskimo Husky as the picture attests.

EDITORIAL

The Pattern of Success in Livestock Disease Control

The war has emphasized, as no other force could, the essentialness of livestock production and livestock health to our national economy and the welfare of our people. The abundance, or the scarcity, of animal and poultry food products has been front-page news in the last few years. The needs of the armed forces, of the civilian population, and of Lend-Lease for meat, dairy, and poultry products have been, and still are, of prime concern, second only to the actual armament requirements of the nation at war. The proposition that "food fights for freedom" has been affirmed repeatedy. The answer to this challenge by American livestock growers, dairymen, and poultrymen has been greater and greater production in spite of tremendous handicaps. The food processing and packing industries have likewise done an unprecedented job in distributing this huge production to consumers in line with the various allotments made for military and civilian quotas.

At the same time, the importance of preventing or reducing disease losses in livestock and poultry has been recognized by several agencies, which gave scant attention to such matters prior to the war. New agencies have even been established to foster livestock and poultry conservation. This is a salutary situation and has produced significant results during the "preparedness" and "fighting" stages of the war to date. If an appropriate concentration of thought and effort along similar lines is extended into the postwar years, further benefits to the livestock and poultry industries, and to our national economy, may be anticipated.

Coöperative Efforts as the Keynote

The coöperative approach to the control and eradication of animal diseases is not new to the American scene. The practical elimination of bovine tuberculosis from a national average of 5 per cent infection to less than 0.2 per cent in a period of twenty-five years is only one of many classic examples that might be cited. Based on fundamental knowledge, the program was supported by leaders in the fields of veterinary and medical science and public health, by prominent individuals and associations in the purebred livestock industry, by the meat-packing and dairy industries, and, in time, by all who recognized the wastefulness of the disease and its relationship to human health.

Under the stimulus of wartime necessity, therefore, it is not surprising that groups of individuals and of organizations in related fields of animal and poultry production have joined, as never before, in fighting wastage of our animal food resources. The pattern of these coöperative undertakings is seen in such organizations as the Inter-Association Council on Animal Disease and Production, the National Poultry Advisory Council, and the National Livestock Conservation Program. All of these have arisen primarily as wartime agencies but their work may develop important postwar values. Of perhaps even greater significance in respect to a long-range program is the creation last year of the Committee on Animal Health of the National Research Council.

Not to be forgotten, of course, is that for many years prior to the war there were already operating in the field of livestock conservation and disease control such agencies as the federal and state bureaus of animal industry, the extension service, the United States Live Stock Sanitary Association, the National Live Stock Loss Prevention Board, and the American Veterinary Medical Association. All of these had definite programs which were expanded to meet wartime needs.

That the areas of interest and effort of most, if not all, of the aforementioned organizations would overlap to a greater or lesser extent was inevitable. The natural result has been some duplication of pro-

grams and work, but the duplication has been more apparent than real because, in most instances, the approach of the respective organizations to any one problem has been different. Actually, their efforts have dovetailed fairly well. The important fact, then, is not so much duplication of activities, but rather that several influential agencies have been working toward a common goal. By so doing, a pattern of coöperation has been established wherein all fields of science, as well as industry, are represented.

ACCOMPLISHMENTS OF SIXTY YEARS

To determine what measure of success may be computed for disease-control programs now under way or to be undertaken in the future, it is helpful to review past accomplishments. In this instance, no better record can be consulted than that of the federal Bureau of Animal Industry which, in 1944, marked sixty years of service. During the three-score years of its existence, the Bureau has led a number of nationwide attacks on animal disease; it has also conducted a wide range of scientific investigations and demonstrations designed to improve livestock and their products.

It is estimated that, during these sixty years, losses from the most serious infectious and parasitic diseases of livestock have been reduced two thirds or more. Specifically, *what* are the accomplishments? To mention only a few:

1) Contagious pleuropneumonia, a devastating disease of cattle which only the elders in the field of veterinary sanitation can recall, was completely eradicated many years ago.

2) Foot-and-mouth disease, still a scourge of livestock in Europe and in several Latin-American countries, has been eradicated on the seven occasions it has gained entry into this country.

3) European fowl pest was eradicated after its introduction into this country.

4) Cattle tick fever has been eradicated from 99 per cent of the area originally infected.

5) Bovine tuberculosis has been reduced from a national average of 5 per cent (1 out of 20 cattle infected) to less than 0.2 per cent (1 out of 500 infected). The most recent figure is 0.18 per cent.

6) Hog cholera losses have been reduced at least two-thirds.

7) Cattle scab has been practically eradicated.

8) Sheep scab losses have been reduced more than 90 per cent, especially in the range country.

9) Glanders of horses is almost unknown now, whereas it used to be a common and serious infection.

10) Dourine of horses has been practically eradicated.

11) Bovine brucellosis is now being attacked on a nationwide front and much progress has been made already in reducing losses.

12) Pullorum disease of poultry has been substantially reduced.

To these, we may add the development of effective vaccination against equine encephalomyelitis and the introduction of phenothiazine as one of the most effective measures, when properly used, against certain internal parasites of livestock.

How have these things been accomplished? By co*öperation*—coöperation of the veterinary services of the federal and state governments; the private veterinary service represented by its thousands of graduate practitioners; animal husbandry and extension forces; educational and public health agencies; the meat, dairy, and poultry industries and, most important, by the cooperation of the individual owners of livestock and poultry themselves.

IMPORTANCE OF FUNDAMENTAL KNOWLEDGE

The accomplishments cited were not easy of attainment. They were the result of programs carefully worked out and executed by trained personnel. The control measures employed were based upon a thorough knowledge of the particular disease, the nature of its causative agent, its mode of transmission, the susceptibilities of various animal species to the infection, and how it might be prevented, stopped from spreading, or cured. The principles of disease control used in attacking these diseases involved far more than the mere injection of a vaccine, bacterin, serum or virus, or the administration of some potent, and perhaps, dangerous chemical or drug.

The point is that the splendid progress over the years was not made by haphazard, hit-or-miss methods. Neither was it made by the razzle-dazzle scheme which some elements in the pharmaceutical and biological industries have been promoting to the nation's druggists especially for the past three years, whereby every druggist is urged to become an "animal disease expert" and, thereby, the diagnostician and prescriber for animal and poultry ailments, not even excluding infectious and contagious dis-

eases. In view of the fundamental principles involved, we seriously doubt if many thoughtful men in the professional ranks of pharmacy are going to risk their reputations and the good-will of their customers by getting into a field for which they are neither technically trained nor legally qualified. Even less do we believe that the nation's farmers and livestock owners are going to forsake, for long, the tried and true principles upon which depend their welfare and their profits as raisers of animal food products.

As recited here, there has been developed and operated in this country, for many years, a pattern of coöperation which has been effective in the control of livestock diseases. The war has served to activate this coöperative principle and method still further. Much progress can be expected for the future if all segments of science, industry, and commercial enterprise, which are sincerely interested in the welfare of the livestock industry, agree upon the fundamental principles concerned and upon the service which each is best fitted to render.

Rabies and Dogdom

The paradox of canine uplifting is the lack of far-ranging effort to control rabies —a manifestly facile undertaking compared with other diseases of domestic animals which have been mastered through the enforcement of regulatory measures. No disease of higher life is better understood than rabies and certainly nowhere in the whirl of animal production has science done a better job of mapping out plans for its extermination. In disease control, rabies *per se* is an easy mark. Dogdom itself is the sole obstacle, and strangely so, in view of the horrors of the disease and the pedophile factor involved. Rabies is making canine saliva as dreaded in the nursery as rattlesnake venom while dogdom seems able to cloud the issue with considerable success. Measures to control rabies are neither initiated nor supported by our dog-promoting industry. In this country, the canine economist bows to the whim of the cynophile. In Great Britain *per contra* the opposite is true. The economics of dog production, which belongs to the big business class there, is protected against the whims of the whimsical. Rabies is kept out —mastered. In the dogdom of the U.S.A., the rules of livestock sanitary science are no more popular than the criminal code in Sing Sing.

Committee Reports of the November Issue

The November issue of the JOURNAL devoted 59 pages to committee reports which were printed in 6 point type to conserve newsprint. These documents touch every phase of veterinary activity in the United States and they portray a vast amount of time-consuming work by the committeemen and administrative officers. The assemblage is impressive and extraordinarily valuable in several respects besides the fund of information contained. They show the scope of work the Association is doing for its members, for the profession *per se*, and for the American people in regard to their subsistence, their health, their general welfare, and their security during a great war.

In our innermost thoughts, we might by-pass the responsibilities the veterinary profession has undertaken but for these reminders that its work must continue with studied effort and increasing vigor.

Moreover, these 59 pages show that the two-year-old plan of having committee reports filed for the attention of the House of Representatives several months prior to the annual meeting is an improvement over the former custom of accepting quick-written or verbal reports as sufficient evidence of the Association's far-ranging obligations. To know what the veterinary service is doing, read these reports.

The 1944 turkey crop is given as 36,666,000, which is 8 per cent above 1943, 4 per cent more than 1940, and 20 per cent above the 1936-1940 average.

The wide distribution of abstracts from the *American Journal of Veterinary Research* and from the JOURNAL, the world-wide circulation of the Veterinary Science Newsletter, furnished monthly to the Office of War Information, and the public relations program conducted by the Association combine to render an outstanding service to the veterinary profession of the United States.

Memorable Event of World War II

The presentation of an American flag to the city of Exeter by the United States Army, and unfurling it along with the Union Jack over the city hall (guildhall) of that historic British city in January, 1943, was a thrilling international event, judging from printed reports of the ceremonies. Military bands and marching troops of both nations participated. The flag was accompanied by a plaque commemorating the donation with the following inscription: "The flags of the New and Old Worlds, hanging side by side, are symbolical of the aim of the United Nations to fashion a new world based on human freedom and high endeavor."

But, to the veterinary profession the event has still greater meaning. His Worship, the Mayor of Exeter, who accepted the gift, is R. Glave Saunders, M.R.C.V.S., F.Z.S., F.R.San.I., the president of the Western Counties Division of the National Veterinary Medical Association, onetime lecturer on veterinary science at Colonial College, a former veterinary inspector for the Ministry of Agriculture, Cornwall County Council, and the Borough of Pensance, and author of important monographs on veterinary science and practical humane society work—summed up, a distinguished British veterinarian.

In making the formal presentation, Lt. Col. H. Smyth, U. S. Army said:

> We are here today to present the people of Exeter this flag—the emblem of the United States of America. This flag symbolizes the union of the 48 states, each of which is represented by a star. It stands for all that is patriotic, loyal, courageous, and just among the people of the United States, and has ever been before them, leading them both in peace and in war for the attainment of the highest objectives known to men.
>
> It stands for everything worth living for and fighting for. It protects the farmer in in his field, the merchant in his store, the mechanic at his bench, and all others who would earn an honest living in America. It guarantees freedom to worship according to the dictates of one's own conscience, and also freedom from fear, want, and hate. The colors that you see there represent the highest virtues of man. The white symbolizes purity, the blue patriotism and loyalty, and the red the blood that has been shed and will be shed for its defense. Mr. Mayor, I present the flag of my country and this plaque commemorating this occasion.

In accepting the gifts, the Mayor spoke of the part Exeter has played in the English-speaking world from William the Conqueror down to the present King and Queen (quoting): "But never had Exeter welcomed anyone more than she was that day welcoming the American troops in what promises to be the most fateful year in the long history of this much-troubled world. For we are not only proud to claim you as blood relatives but as our allies in arms, imbued with the high principles for which the Allied nations are fighting." In speaking of the events of 1776, His Worship told how impossible it is to keep the English-speaking people apart and quoted Article II of the Declaration of Independence, to wit: "To form a treaty of alliance and friendship for the common defense, assisting each other against all violence that might threaten all or any of us on account of religion, sovereignty, commerce, or any other against all violence that might sounded "Retreat" as the Stars and Stripes was unfurled between the Union Jack and the flag of Exeter, bearing the motto,

R. Glave Saunders, M.R.C.V.S., F.Z.S., F.R.San.I., the Mayor of Exeter.

Semper Fidelis. Deafening applause from the crowds ended a historic ceremony of World War II that will long be remembered and certainly not soon forgotten in the veterinary profession. We salute His Worship, the Mayor of Exeter.

Presentation of the Stars and Stripes and a plaque to the city of Exeter (England), Jan. 30, 1943. First from the left is Lt. Col. H. Smyth, U. S. Army Civil Affairs Officer. Second from the left is His Worship, R. Glave Saunders, M.R.C.V.S., Mayor of Exeter.

The Unmanaged Drug Trade, a Disservice

In the interest of the public, the medical, dental, and veterinary professions oppose the care-free use of medicinal agents and they barely succeed in preventing utter chaos in the medical fields, because "the trade" is able to hoodwink the suckers with crocodile tears, or high pressure salesmanship. In the case of selling oral cold vaccines "over the counter", the *Journal of the American Medical Association* dubs the practice as "an unwarranted commercial assault on the public pocketbook." By the same token, the respectable segment of the veterinary profession registers its opposition to incompetent medical practices in the field of animal production, not only because of assaulting pocketbooks but, more particularly, on the ground that care-free selling of biological and pharmaceutical products complicates the medical problems involved, and thus makes preservation of health, life, and property more difficult.

Livestock Killed on Railroad Tracks

General Livestock Agent Earle G. Reed, of the Union Pacific, draws attention to the potential number of beef steaks, roasts, and lamb chops that are lost through the killing of stray livestock on railway rights of way. In 1943, the stockholders of that railroad lost $45,000 in payment of over 400 claims averaging $110 each. The number of animals killed has averaged over 1,000 head per year. The owners think they receive too little, the railroads believe they are literally paying for a "dead horse," and question the responsibility. Many of these livestock losses are preventable. Causes: open gates, neglected fences, bulling cows and amorous bulls, plus letting animals graze on the right of way. Results: loss of thousands of meat animals, and millions in meat poundage.

What a soldier in a foxhole can't understand—why civilians have to be coaxed to buy War Bonds.

CURRENT LITERATURE

ABSTRACTS

Meat Inspection in Poland

Meat inspection in prewar Poland was directed and conducted by veterinarians. The minister of agriculture was empowered by law to prohibit the use of private slaughterhouses in urban centers of 5,000 population and over. Veterinary supervision was mandatory. As a consequence, abattoirs remaining under the management of laymen lost prestige and were known as mere "meat factories." By 1939 there were but two large abattoirs in all of Poland that remained under lay administration. The government was planning to conduct special courses in meat inspection, abattoir construction suitable for the different species of animals, canning, packing, production of by-products, and the relationship of hygiene to the meat trade.—[*Communication from Dr. Alfred Ginsberg, Veterinary College, Lwów: Abattoir Management in Poland, The Veterinary Record, 56, (July 1, 1944): 234.*]

Agriculture, Manufacture, Service

In 1870, 75.4 per cent of the American population was engaged in agriculture and manufacture, and 24.6 per cent in rendering service to these two industries. In 1920, the proportion in agriculture and manufacture was 60.6 per cent and in service, 39.4 per cent. In 1930, the figures were 52.8 per cent for agriculture and manufacture and 47.2 per cent for service. By service is meant the following groups:

1) Wholesale and retail trade
2) Transportation (railroads, busses, etc.).
3) Communication (telephone, telegraph, radio).
4) Finance (banks, insurance, brokerage).
5) Office workers.
6) Hotels and restaurants.
7) Education (teachers, librarians, etc.).
8) Publishers (newspapers, books, magazines, advertising).
9) Professions (physicians, dentists, veterinarians, nurses, lawyers, ministers, artists, authors, musicians, photographers, architects, *et al.*).
10) Public employees (civil, military, naval).

Note the mounting percentage of the service group (47.2%) and the declining percentage of the producer group of 1930 (52.8%) as compared with 1870's 75.4 per cent for producers, and but 24.6 per cent to render service to them in the different rôles enumerated. The figures show that fewer producers employ more and more people to serve them in a nonproductive capacity. The increase in the service group and the declining number engaged in production is the inevitable result of high standards of living.—*C. Hartley Grattan: Factories Can't Employ Everybody. Harper's Magazine, No. 1132 (Sept. 1944): 201-204.*

U. S. Army Veterinary Service in Australia

The veterinary service in Australia is organized and administered under the Veterinarian, Office of the Surgeon, U. S. Army Service of Supply. Food inspection is administered through base section veterinarians who report directly to the Veterinarian, S.O.S. The base section veterinarians are responsible for forage inspection, construction and maintenance of veterinary hospitals in their areas, and the debarkation and embarkation of animals at ports under their jurisdiction. Unit veterinarians report directly through higher tactical headquarters to the Veterinarian, S.O.S. for consolidation and transmittal to the Surgeon General.

Animals obtained in Australia are purchased, processed, and issued by the quartermaster remount depot which functions under G-4, S.O.S. Veterinary units arriving in Australia report for duty at the remount depot while awaiting assignment.

No long forage is fed except on farms. The roughage called chaff, is oat, wheat, or alfalfa hay chopped short and baled in 60-lb. bales. A moderate amount of grain is fed separately and animals are fed five times a day. In the field, our army has wisely adopted nosebag feeding of grain.

Since Australia caters to exportation of animal products, it maintains a standard of food inspection comparable to that of our bureau of animal industry; one difference being that less authority is exercised over the sanitation of premises. Public health officers look after that phase, and the packing houses are models of

sanitation. The Australian veterinary inspectors are highly qualified and coöperative; all are veterinary college graduates. In New Guinea, slaughtered animals are inspected by our corps.

The Colonel describes the methods pursued in the handling of beef, pork, sausages, poultry, fish, eggs, canned meats, and dairy products. The milk purchased for American troops is from cows certified as free from tuberculosis and brucellosis. The testing is done under a national program comparable to our accredited herd plan.

The logistics of former wars were insignificant compared with those of the South Pacific theater. The supply of food at the Battle of Buna will long be remembered as a feat in military achievement. Here the veterinary officer played a part just as surely as the fighting soldier. In a climate where boots mold over night, metal, unpainted, rusts through rapidly, and jungle steam penetrates all types of protective covering, only eternal vigilance of the veterinary officers assures wholesome food for the men on the firing line. Important suggestions on packaging food for use under such conditions are made.

Australian pack saddles are preferable to our own for small animals. Stock saddles have no horn but have a higher pommel and cantle. The cutting horses of the Australian cowboy are better bred than our western bronchos. The author writes complimentarily of the efficiency of the Australian veterinary service and of the excellent coöperation between the two military forces and the civilian population.—[*Lt. Col. Stanley M. Nevin, V.C., U. S. Army. U. S. Army Veterinary Service in Australia. The Bulletin of the U. S. Army Medical Department, 81, (Oct. 1944):113-119.*]

Certification of Cattle for Export

Of 57,087 dairy cattle and breeding types exported from Canada during the year ending March 31, 1944, 45 were refused entry to the United States. Of another 12,098 exported by July 19, 1944, 27 were refused. Abnormalities of the head, neck, and udder were the cause of the rejections. While the percentage of rejections was low, inspectors are admonished to observe the requirements of the importing country in the interest of the export trade. Apart from disease, abnormal animals should not be certified for export. It is a waste of time to subject undesirable animals to blood or tuberculin tests. Any animals with enlargements or nodules on the neck, whether deemed important or not, are refused by the United States. Indurations, atrophy, blind teats, or traumatisms are rejected at the border. The way to avoid rejections is to make the right sort of physical examination at the point of origin. Some cattle are refused on account of lost ear tags. Tagging should, therefore, be carefully done. Watch for the letter B, tattooed on the ear of reactors to the blood test for brucellosis. Some dealers may try to get such animals passed. The markings of registered (purebred) animals must be checked against those shown on the registration certificate. Slight errors in this respect or in the tattoo letter or number lead to difficulties. Owing to shortage of personnel in the Health of Animals Division, much of this service falls to the accredited veterinarians. In some instances, it constitutes an important part of their practice.—[*O. Hall, Health of Animals Division, Dominion Department of Agriculture: Canad. J. Comp. Med. and Vet. Sci., 8, (Sept. 1944): 246-247.*]

BOOK NOTICES

Proceedings, New Zealand Veterinary Association

The report of the 1943 meeting of the Dominion association of New Zealand is a well-edited multigram, portraying the veterinary situation of a small but manifestly important livestock country where the veterinary service is bent an expanding its usefulness to the people. Farmers are being urged to appraise veterinary science at its par value and to back the founding of a veterinary college in the Department of Agriculture to insure a sufficient personnel and permanent progress. There are but 86 veterinarians on the island, 6 of whom are in the Army, 7 retired, and 2 teaching. Of the remaining 71, 16 are in private practice, 19 are employed by livestock clubs or factories, 25 are engaged in research, and 11 are fulltime employees of the Department of Agriculture. The Association has a membership of 71. The need of aggrandizing the veterinary service is shown by comparing Great Britain with New Zealand. Whereas a British veterinarian cares for 23,000 farm animals and 35,000 fowl, the New Zealander has 470,000 farm animals and 52,000 fowl to look after. Annual death losses are given as £10,000,000 for cattle, £5,000,000 for sheep, £182,000 for swine, and £600,000 for poultry.

There is neither foot-and-mouth disease nor hog cholera in New Zealand. Perhaps, the presence of these would stir up more interest in veterinarians than the present method of keeping them out, the president said ironically. The main losses in cattle are from mastitis, brucellosis, tuberculosis, sterility, the milk fever trinity, grass tetany, ketosis, Johne's disease, actinomycosis, and blackleg. Tuberculosis, salmonellosis, and deficiency diseases are the chief

diseases, pregnancy diseases, facial eczema, pulpy kidney, arthritis, black disease, blackleg, and circling disease are named as the principal troubles encountered in sheep. Poultry has its coccidiosis, pullorum disease, pox, parasites, and leucosis. Veterinarians need not be told to what extent losses from these maladies can be prevented. To equal the service in Great Britain, New Zealand should have 1,000 or more veterinarians, instead of 71. The importance of "putting over" these facts is emphasized.

The book contains significant papers and discussions on (1) "Mangel Poisoning in Pigs," giving a critical study of nitrate-nitrite conversion in a batch of cooked beets which killed 200 out of 600 pigs within a few hours; (2) "The Food Intake of Grazing Sheep"; (3) "Gastrointestinal Troubles of Horses"; (4) "Vaccination Against Bovine Brucellosis," in which strain 19 and McEwen's strain 45/20 are discussed without prejudice or conclusion; (5) "Copper Deficiency in New Zealand," a discussion of the relation of copper deficiency to swayback in England and enzoötic ataxia, falling disease and peat scours (dairy cows) of Australia, together with a report on regional copper-deficient soils; (6) "Hormones in the Maintenance of Lactation"; (7) "Problems of Parasite Control," discussing the standard anthelminics and ectoparasitic treatments and preventives; (8) "Rôle of the Veterinarian in Poultry-Disease Control," an appeal for collaboration with the "poultry instructor"; and (9) "Trends Affecting Food Production," a comprehensive analysis of world-wide needs and changes brought about by the war.

One is impressed with this report for the "sense of contact" it brings, the technical information contained, and the spirit it displays athwart the public indifference under which veterinarians must labor in "this world of ours."—[*Proceedings of the Twentieth Annual General Meeting of the New Zealand Veterinary Association, Inc. Board. 89 pages. Published by the Association.*]

"A Progress Report"

The First Report of the Committee on Animal Health, National Research Council, is a bound reprint of an article entitled "Recommendations for Prevention of Bloat in Cattle and Sheep" which was published in the Nutrition section of the November 1943 issue of the Journal. The reprint is referred to here and in this fashion because articles of great value may sometimes seem too prosaic to attract attention to the treasure their context embraces. The report on "bloat" prepared for the National Research Council by Cole, Amadon, Dougherty, Espe, Huffman, Olson and Schalk, is such an article. It is commended to practitioners for careful study.—[*First Report of the Committee on Animal Health, N.R.C. Reprint No. 119, National Research Council, 2101 Constitution Ave., Washigton 25, D. C. Price 25 cents.*]

Dogs at War

Because the use of animals for the benefit of man is the background of veterinary science, a book on war dogs by a capable author and reliable publisher is a precious stop gap in the veterinarian's library, as the greatest of all wars is raging, particularly so in the United States where the domestic canine is a debutant in military organization. In veterinary medicine, *ex necessitate rei*, the domestic animal is likened to the architect's building and the engineer's machine. In zoötechnics, purely sentimental balderdash has to be carefully weighed. So, a book on war dogs during this critical period that tells "the truth, the whole truth, and nothing but the truth" is refreshing and useful.

—*From Dogs at War, official U. S. Marine Corps Photo*

Caesar was the only means of communication.

Except in English-speaking countries, war dogs have figured in the great wars in history; in Great Britain, in a small way during the later phases of World War I; and in this country, not at all until World War II was well under way. When Germany blitzed Poland, she had 200,000 trained war dogs. Russia trained some 50,000 during the early stages of the war, and Japan is said to have used from

10,000 to 25,000 dogs in the Malay campaign. At the time of the rape of Pearl Harbor, the United States was without a single military dog. Six months later (May, 1942) under the urge of the American Kennel Club, the army was training 9 dogs. Two years later, 20,000 were in training or in service in scattered parts of the world. Dogs for Defense, a nonprofit corporation, had been organized and was appointed the authorized procurement agency by the Secretary of War. The estimated value of the dogs furnished, is $2,000,000. Training stations were established and expert trainers employed. At this time (Oct., 1944), dogs are attached to troops in many theaters of operation. Thus was created the unit officially known as the K-9 Corps, U. S. Army. It is directed by the Remount Division of the Quartermaster Corps.

For information on breeds, preferred types, basic and specialized training, amusing anecdotes, and classes (parachutists, marine devils, tank destroyers, mine finders, attackers, messengers, sentries, medical and Red Cross dogs, and others) one must read this factual compilation. As this too brief review is being written, American war dogs are with the troops advancing on Berlin and Tokyo, and no doubt are writing brilliant pages into American history.

The author is in the Overseas News Division of the Office of War Information, and the book was written with the approval and coöperation of the War Department, Marine Corps, and the Coast Guard. The 35 excellent pictures were supplied from these official sources. Here is another book on the utilization of domestic animals that every veterinarian should have and should recommend for use in the public schools.—[*Dogs at War. By Clayton G. Going with an introduction by Lowell Thomas. Cloth. 209 pages. The Macmillan Company, New York. 1944. Price $2.50.*]

The Current List of Medical Literature and the Veterinarian*

It is recognized generally that the cessation of formal professional training does not, and certainly should not, connote the end of further learning. While some of this continuing education comes from a widening practical experience, yet the application of new knowledge derived from research is essential to improved clinical practice. To the research worker, the results of experimental procedures performed elsewhere may be directive or determining to the progress of his own work or problem.

The volume of veterinary literature makes it almost impossible for any one clinician or research worker to see and review it all. Even if access to all the journals in his field were possible, the time expended in looking through volumes of no immediate worth would make the effort unprofitable. However, a service for keeping up with current literature is provided at the Army Medical Library, Washington, D. C., through the *Current List of Medical Literature*. This list, which is published weekly, provides a broad coverage of journals under fifty subject groups, including veterinary medicine. Under each subject group, and under the title and the date of each journal, appears the author and the title of the article. A check of this list, especially in the fields of greatest interest, yields a rapid review of new publications. A semiannual index is arranged by subject with a special section devoted to veterinary medicine.

An article of interest sufficient to justify consulting the original, when the latter is not available, may be obtained in microfilm. This service is free, except for the nominal postage charge of 1½ cents for a length of film reproducing up to 50 pages. Microfilm requires little space for storage and is convenient to use. Readers for microfilm copy cost $3.75 each.

It is hoped, and almost certain, that veterinarians will recognize the value of these services and will use them in their research and in their clinical practice.—*Orders for the Current List of Medical Literature may be placed through the Medicofilm Service, Army Medical Library, 7th St. and Independence Ave., S.W., Washington 25, D. C. The domestic subscription is $5.00 per year. Microfilms are available through the Photoduplication Service of the Library.*

*From Miss Florence Harden, Army Medical Library, Washington, D. C.

Proceedings Kansas Veterinary Medical Association

Associations which publish the proceedings of their annual sessions in book form deserve to be complimented for keeping the records of their work in order and thus assemble the facts which future veterinary historians will use to good advantage. While some of the papers presented should have wider circulation for maximum benefits, that disadvantage is offset by the availability of the material to those desiring to publish it. What is more important from the professional standpoint is that these booklets tell the story of what the veterinarians of the given jurisdiction are doing, and how they are doing it. The serious-minded presidents of state associations invariably review the local situation and drop golden thoughts which are forever lost for the guidance of their successors. These are the records and the stepping stones of progress yet none of them would be published but for these year books. Being well edited and printed, the 1944 book of the K.V.M.A. is a reminder of these facts. An address of welcome by the Mayor of Wichita, response by Coffey, a review of the veterinary situation of Kansas and preview of the meeting by President Lumb, the story of the livestock sanitary service by Commissioner Will J. Miller, addresses by Donham of Purdue on brucellosis, Hastings of Illinois on nutrition, and Sanders and Quin of Kansas City on vesicular stomatitis, and talks on the AVMA by Bower and Stewart, make up a text rich in useful information.—[*Proceedings, Kansas Veterinary Medical Association, 1944. Compiled by Secretary Charles W. Bower. Board. 75 pages. Published by the Association.*]

Reproduced from one of a series of nationwide advertisements by Wilson and Co., Chicago, in various sections of the livestock and agricultural press, portraying the services of key people in the livestock and meat industry. The original appeared in the August, 1944, issues of the American Cattle Breeder, Kansas Stockman, Cedar Rapids Gazette, and Albert Lea Farm Tab.

Dr. Ralph F. Vermilya and Dr. Harry E. Kingman, Jr. are well-known veterinarians on the staff of Wilson and Co.

THE NEWS

Postwar Planning

The basic idea in postwar planning is to expand the veterinary service into new and undeveloped fields such as food inspection and artificial insemination, and to coöperate with state and federal authorities in encouraging part-time service where veterinary service of the right type is sparse, and to discourage placing two veterinarians where one is sufficient. The Committee on Postwar Planning is active on a nationwide scale. For the last two years, members of the Committee on Food Hygiene have been making up a comprehensive program relating to poultry-food inspection for early publication, which will cover that branch of food production from farm to home through cooperation of the poultry industry and manufacturers of freezing units for home and market. The plan is audacious, complete, and seems to be enthusiastically approved by all concerned in promoting the popularity of poultry. Details will be published in early issues of the JOURNAL. It involves education and training on food inspection in the veterinary colleges, the installation of suitable equipment in poultry-dressing and freezing plants, and extending the use of freezer units in the home and markets.

Can You Help Locate These Members?

The aid of JOURNAL readers is solicited in locating the following members, mail to whom has been returned to the Association's central office. The last known address of each is given. Should you be able to provide information as to present residence, your advice *via* postcard or letter will be greatly appreciated.

Aasen, Stephen W., Marshfield, Ore.
Bright, James E., Filmore St., Osceola, Iowa.
Brown, Frank L., 38 Rear, 17th Ave., Columbus, Ohio.
Burns, John R., DeSota Hotel, Galena, Ill.
Burnside, Otis H., Box 212, Greenville, Ala.
Crippen, Donald A., 1312 Willard, Houston, Texas.
Dimmerling, Lucille S., Box 29, Notasulga, Ala.
Eastman, Jeness W., Coldwater, Mich.
Elliott, Herbert B., West Mansfield, Ohio.
Evans, Ralph W., R.F.D. No. 5, Medina, Ohio.
Ferrell, Edwin H., 116 Government St., Baton Rouge 10, La.
Fink, Carl, 1426 10th, Pt. Arthur, Texas.
Fish, Richard B., So. Van Pelt St., Philadelphia, Pa.
France, Walker, Boonville, Ind.
Geierman, Joseph L., Box 32, Richfield, Utah.
Graham, J. A., Bldg. T218 Co. D 2nd MTB, Camp Grant, Ill.
Greene, J. E., Grand Rapids Exchange, Grand Rapids, Mich.
Jasmin, Arthur M., 4360 146th St., Cleveland, Ohio.
Jones, Thos. J., 182 Wray St., Athens, Ga.
Karber, Milvin W., C/o Army Med. Center, Washington, D. C.
Keller, E. J., 6028 Romany Rd., Oakland, Calif.
Kilpatrick, W. C., 220 N. 18th Ave., Yakima, Wash.
Lusk, David E., 7th Vet. Co., APO 360, Fort Benning, Ga.
McLeod, Kenneth L., 1232 2nd Ave., Antigo, Wis.
Mannasmith, Clarence H., c/o Dr. Geo. A. Hawthorne, Clarence, Iowa.
Martin, Ansel R., 3 Garden Ave., Ithaca, N. Y.
Meyer, Leo J., APO 7769, c/o P. M., San Francisco, Calif.
Minsky, Simon, 978 Lenox Rd., Brooklyn, N. Y.
Moffat, G. C., Centuria, Wis.
Moughon, William C., Box 609, El Campo, Texas.
Norman, C. T., 2965 N. E. Sandy Blvd., Portland 12, Ore.
Pentifuff, Clarence, Jr., Station Veterinarian, Prisoner of War Camp, McAlester, Okla.
Remsberg, Glenn S., c/o Bonnie Remsberg, Iola, Kansas.
Reppert, R. E., 1020 W. Wayne St., Ft. Wayne, Ind.
Roberts, M. P., ASF Repl. Depot, Camp Reynolds, Greenville, Pa.
Rubenstein, Abraham M., 1251 Euclid Ave., Miami Beach 30, Fla.
Silverman, Charles A., 2343 E. B St., Torrington, Wyo.
Skold, Bernard H., Camp Hunter, Leggett, Calif.
Sledge, J. L., 3708 8th St., Meridian, Miss.
Stephens, Seidel M., Hq. 16th Wing, A.A.B., El Paso, Texas.
Tamoglia, T. W., Prisoner of War Camp, Lordsburg, N. Mex.
Taylor, Clarence L., Casual Det. Hqs. SOS, APO 3485, c/o P.M., Miami, Fla.
Thompson, Charles F., 603 22nd St., N. W., Washington 7, D. C.
Trundy, Edward L., General Delivery, Winthrop, Maine.
Tuder, Gabriel, Standish, Mich.
Whitehead, Chas. J., 1590 Goodbar Ave., Memphis, Tenn.
Woolfe, Daniel T., 260 E. Main St., Brewster, N. Y.

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.

First Listing

BRENNY, RAYMOND N.
Veterinary Station Hospital, Ft. Des Moines, Iowa.
D.V.M., Iowa State College, 1937.
Vouchers: C. A. DeValois and J. S. Koen.

CONVERSE, JAMES M.
P. O. Box 377, Mayfield, Ky.
D.V.M., Ohio State University, 1943.
Vouchers: L. G. Northington and J. Miller.

ENGEL, A. J.
Frankenmuth, Mich.
D.V.M., Grand Rapids Veterinary College, 1917.
Vouchers: G. J. Fohey and B. J. Killham.

FOX, G. M.
214 Bridgeway St., Aurora, Ind.
D.V.M., Cincinnati Veterinary College, 1916.
Vouchers: M. A. Fox and R. J. Hoskins.

JOHNSON, PETER V.
R.F.D. Box 48, Ashland, Mass.
V.M.D., University of Pennsylvania, 1941.
Vouchers: E. A. Tucker and L. A. Paquin.

JOHNSTON, E. F.
Carp, Ont., Can.
B.V.Sc., Ontario Veterinary College, 1922.
Vouchers: R. Gwatkin and C. A. Mitchell.

MCCLUNG, H. E.
22579 B St., Hayward, Calif.
D.V.M., Kansas State College, 1929.
Vouchers: N. E. Clemens and N. R. Brewer.

MANNING, M. M.
Yale, Iowa.
D.V.M., Iowa State College, 1920.
Vouchers: R. M. Carter and G. B. Munger.

RUCK, RICHARD A.
Base Veterinarian, AAF Dispensary (non-tactical), Nashville Municipal Airport, Nashville, Tenn.
D.V.M., Alabama Polytechnic Institute, 1937.
Vouchers: L. E. Seay and T. E. Willis.

SWICK, CALVIN A.
Station Veterinarian, Camp Callan, San Diego 14, Calif.
D.V.M., Iowa State College, 1938.
Vouchers: R. E. Savage and W. C. Schofield.

Second Listing

Adair, George T., Millhaven Farm, Cleveland, Ga.
Anderson, Guy R., Jr., Box 4187—300 S. Texas Ave., Odessa, Texas.
Armistead, W. W., Fort Reno, Okla.
Baldwin, F. M., Horton, Kansas.
Barton, W. W., Minier, Ill.
Carroll, R. E., Box 731, Harlingen, Texas.
Case, T. A., Box 556, Nickerson, Kansas.
Fitte, John M., Box 124, Marlin, Texas.
Grimsley, Roy, Allen, Kansas.
Hale, Clyde F., 117 Court St., Charleston, W. Va.
Hodges, W. Ross, Ranger, Texas.
Howard, Paul V., Hunsberger, N. E.—Rt. No. 4, Grand Rapids 5, Mich.
Huston, J. D., 823 West Office, Harrodsburg, Ky.
Keller, Robert J., 4608 S. 7th St., Louisville 8, Ky.
Kirk, H. M., Griswold, Iowa.
Lockhart, G. P., Presidente Betto 2730, Montevideo, Uruguay.
Mosci, Amleto, Rua Contagem 241, Belo Horizonte, Minas, Brazil.
Paige, R. A., 1360 Rood Ave., Grand Junction, Colo.
Perrin, William O., Wharton, Texas.
Reiser, E. T., 612 Walnut St., Windsor, Colo.
Thomas, Jay N., LAAF—Station Hosp., Del Rio, Texas.
Thomas, R. F., 86 Cain St., Atlanta, Ga.
Watson, J. S., 819 E. Grayson St., Mexia, Texas.
Wells, V. L., P. O. Box 593, Selma, Ala.

1944 Graduate Applicants

The following are graduates who have recently received their veterinary degrees and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of junior chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Texas A. & M. College

CHAMPION, C. L., D.V.M.
Jefferson, Texas.
Vouchers: R. P. Marsteller and R. D. Turk.

HOLBROOK, LEO C., D.V.M.
Rt. 2, Box 363, San Antonio, Texas.
Vouchers: R. P. Marsteller and R. D. Turk.

Second Listing

Michigan State College

Eastman, Jeness W., D.V.M., Coldwater, Mich.
Milliman, Earl M., D.V.M., Richland, Mich.
Molinare, Peter B., D.V.M., c/o G. Weidman, Ableman, Wis.
Moser, James H., D.V.M., Rt. No. 2, Rochester, Mich.
Pray, John D., D.V.M., Levering, Mich.
Sigars, Denzil B., D.V.M., Waco, Mo.

State College of Washington

Darnell, Glenn R., D.V.M., Cathlamet, Wash.
Dow, Carroll E., D.V.M., Rt. No. 2, Box 28, Lodi, Calif.
Downs, George, D.V.M., 2363 Broadway, Redwood City, Calif.

Klavano, Paul A., D.V.M., 122 College Station, Pullman, Wash.
Kuhn, U. S. G., III, D.V.M., 357 Lee St., Seattle, Wash.
Lee, Weldon R., D.V.M., Box 527, Salmon, Idaho.
Mahoney, Mervyn, D.V.M., Rt. No. 4, Box 156, Petaluma, Calif.

COMMENCEMENTS

Michigan State College

The following students, presented by Dean Ward Giltner, received the degree of Doctor of Veterinary Medicine on September 1, 1944:

Ashby, Howard C.	Lipson, Milton P.
Bivins, James A.	*Mauck, Benj. F., Jr.
*Blind, William D.	Meyers, Ivan S.
Bolton, Wesson D.	Miller, Paul T.
Bortree, Alfred L.	Millerick, Thomas I.
*Bryan, Harold S.	Milliman, Earl M.
Bush, Charles T.	Molinare, Peter B.
Bush, Donald L.	Mootz, Chas. E., Jr.
Buth, Peter A.	Moser, James H.
*Collins, Douglas J.	Neff, Jacque W.
Colton, Max W.	Neff, Paul E.
Curell, Sherman P.	O'Rourke, W. J.
Drury, Albert R.	Phillips, Thomas H.
Eastman, Jeness W.	Pray, John D.
Flynn, Robert J.	Preston, Jack W.
Freid, Norman T.	Pula, Joseph F.
Gingrick, Kenneth S.	Russell, Donna L.
Godisak, John J.	Semtner, W. K.
Goodman, John T.	Siefert, F. W.
Greer, Joseph E.	Siegmund, Otto H.
Hodulik, Charles J.	Sigars, Denzil B.
Hulen, Carl S.	Smith, Arlan, R.
Jackson, Ted F.	*Washko, Floyd V.
Johnson, Earl W.	Wernert, Harry M.
Klotz, Bruce F.	Zingeser, E. R.
Krieger, George T.	Zwiers, John S.
Krushak, Donald H.	**Zeches, Wm. J.

*With honor.
**Deceased June 10, 1944, degree granted posthumously.

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The following students received the degree of Doctor of Veterinary Medicine on March 18, 1944:

Belding, T. C.	Gray, Clinton W.
Bigelow, Myron C.	Konde, William N.
Wescott, Roy W.	

Philip A. Hawkins received the degree of Doctor of Veterinary Medicine on June 10, 1944.

U. S. GOVERNMENT

K-9 Platoons.—Quartermaster Dog Platoons are a part of the military organization in the South Pacific theater. Attached are veterinary technicians, trained and equipped to render first aid to sick and injured dogs under their care. The dogs are trained to locate snipers and camouflaged positions of the enemy. Having more than justified itself, the K-9 Corps has probably won a permanent place in our future military setup.

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Dr. T. W. Cole has been appointed superintendent of the Athenia quarantine station, Clifton, N. J., succeeding Dr. A. F. Staub who will retire November 30. Dr. Cole will also serve as inspector in charge of the Port of New York. Prior to his new assignment, Dr. Cole held the position of assistant chief of the Bureau of Animal Industry Field Inspection Division at Washington. He has had a wide experience in livestock inspection and disease-eradication work, and has served on special assignments in our island possessions and Cuba and Mexico. He directed all of the Bureau's field activities in Florida for a number of years before being transferred to the Washington office. He was born and raised at McKinney, Texas.

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Good Health Among Soldiers —Admissions to hospitals from troop stations in the United States are not only lower than during World War I but also for the peacetime years. Wholesome subsistence, chemotherapy, and higher physical average of the soldiers account in part for this decrease.

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Army Dietitians.—Approximately 1,000 army dietitians are serving on hospital ships, in general hospitals, in the theaters of operation, and at stations.

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Broadens Public Health Service.—The Act of Congress signed by the President on July 3, 1944, broadens the scope of the Public Health Service Act passed in 1939. The President commended the PHS for "its excellent record in protecting the health of the nation." The Act authorizes federal grants for research by nongovernment institutions, larger appropriations to aid state public health work, for the establishment of a national tuberculosis program, and for expanding investigation in any field related to public health.—*From Science.*

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New Meat Inspection Chief.—Retirement of Dr. George E. Totten (C.V.C., '98), chief of the Meat Inspection Division, War Food Administration, USDA, was announced on Oct. 27, 1944. He will be succeeded by Dr. Albert R. Miller (I.S.C., '24), assistant chief.

Dr. Totten's retirement completes forty-six years of service with the U. S. Department of Agriculture which he entered in July, 1898. His service began at Indianapolis and he subsequently was stationed at a number of important meat inspection centers including Kansas City, Denver, Pittsburgh, St. Paul, and

Chicago. While at Denver, Dr. Totten was inspector in charge of field work in Colorado, Wyoming, Nebraska, Kansas, and New Mexico. He was transferred from Chicago to Washington in 1936 as assistant chief of the division and was appointed chief Jan. 1, 1944, succeeding Dr. E. C. Joss.

Dr. Miller, who succeeds Dr. Totten, began his career in the Meat Inspection Division in 1927 as an inspector at the Chicago station. Since then, he has served at Jersey City, New York City, South Kortright, N. Y., and Washington.

• • •

Restaurant Sanitation Ordinance.—The Restaurant Sanitation Ordinance made up by the U. S. Public Health Service is in effect in 12 entire states (including D.C.), 108 counties and 178 cities in 25 other states. For copies and information pertaining thereto, address Sanitary Engineering Division, Milk and Food Section, U. S. Public Health Service, Washington, D. C.

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The current beef set-aside order for the Army has overwhelmed the BAI inspectors to such an extent that officers of the Veterinary Corps have been assigned for duty in abattoirs to help out. In October they were reported to be inspecting slaughtered cattle at the rate of 2,600 head monthly. Over 21,500,000 lb. of meat, meat food, and dairy products are inspected daily in continental United States by the Veterinary Corps.—*Technical Information Division, Surgeon General's Office.*

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Mules for the Overseas Troops.—The War Shipping Administration has allocated 17 Liberty ships for conversion into transports for mules and animal equipment for overseas service, according to newspaper dispatches, one of which is highly perturbed over the scarcity of the long-eared hybrid.

AMONG THE STATES

Arizona

State Association.—Since the increasing occurrence of rabies in dogs, cats, cattle, horses, goats, swine, and coyotes during the last two years, the Arizona Veterinary Medical Association has drawn up a control program for the health officer of Maricopa County providing for the founding of a County Humane Board, representing the Maricopa Medical Association, the Arizona Sheep Sanitary Commission, Sahuaro State Kennel Club, City of Phoenix Humane Board, Live Stock Sanitary Board, Arizona Veterinary Medical Association, and Parent Teachers Association. The incidence of confirmed rabies in Maricopa County in 1943 was 99 cases in dogs, 8 in cats, 1 in coyotes, and 1 in cattle. During the first seven months of 1944, 102 positives were reported; exclusive of 199 clinical cases reported by the practicing veterinarians of the county, and 1 human case. The Pasteur treatment was given to 600 persons. The program of control mapped out comprised the licensing and vaccinating of all dogs, and supplying the materials and personnel. At the 16 stations, established for the purpose, 8,425 dogs were vaccinated in five and one-half days, and at the end of the first sixty days of the quarantine, all officers concerned were enforcing the regulations formulated. The newspapers and radios gave the program and participating veterinarians favorable publicity. The Board under date of Sept. 11, 1944, promulgated a set of strong resolutions directing that the program outlined be strictly enforced by the proper authorities. All of the details pertaining to rabies control are included in the Board's directives.—*Excerpts from a comprehensive report submitted by*

DONALD MILLER, D.V.M.,
Resident Secretary.

Arkansas

State Pays Damages for Malpractice.—From the *Arkansas Gazette*, Little Rock, we quote: "The state Claims Commission, which paid a total of $15,345.35 in claims yesterday (Oct. 3) will propose to the Live Stock Sanitary Board that steps be taken to protect the state against financial loss when privately owned animals die after vaccination by the state veterinarian.

"A resolution for submission to the board was adopted by the commission as a result of a $2,035 claim filed by the Stimson Veneer and Lumber Trust of Dumas for the death of 19 horses which died in 1941 when given the wrong kind of vaccine. The Commission allowed the claim."

• • •

Outbreak of Equine Encephalomyelitis.—"Sleeping Sickness Outbreak Serious," is the headline of a Bentonville dispatch to the *Arkansas Gazette*, October 1, announcing the prevalence of that disease in the northwestern part of the state. More than 1,000 horses and mules were vaccinated the previous week under the direction of Dr. Dave Ibsen of the State Veterinary Department.

[Four letters and clippings, received from a retired BAI inspector, describe the unsatisfactory veterinary situation in his "neck of Arkansas", and add how incompetent men fly from farm to farm, vaccinating horses, and gather rolls of dollar bills "that would choke a horse." In the absence of qualified veterinarians, the county agent's office is in charge of the livestock sanitary work. Cause: The

over-all insufficient number of veterinarians in the United States dating from "'way back when." A country that grew to 120,000,000 people and a vast livestock population before establishing a formal veterinary educational system can't build up a complete veterinary service in a few years. During this formative period, it may soon come to pass that the livestock owners of the thoughtful states will have to protect themselves by quarantine against the shiftless ways of the negligent. If a state likes its quack animal doctors, the nation's food-producing machinery may have to be protected against them.—Ed.]

Colorado

Junior Veterinary Medical Association.—The chapter at Colorado State College has elected the following to serve on the executive committee for the fall semester of 1944: John Carricaburu, *president;* John Chapin, *vice-president;* Robert Dickson, *secretary;* Charles Campbell, *treasurer.*

s/ ROBERT DICKSON, *Secretary.*

Florida

State Association.—The Florida State Veterinary Medical Association held its annual meeting in Daytona Beach, Oct. 30-31, 1944. The following program was presented:

H. W. Willis, Ocala: "Swine Disease Case Reports."

M. W. Emmel, Gainesville: "Navel Ill in Range Calves."

A. H. Quin, Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.: "Developments in the Field of Clinical Veterinary Medicine."

E. F. Thomas, Ocala: "Artificial Breeding of Cattle in General Practice."

S. F. Stapleton, Americus, Ga.: "Allergic Skin Disorders of the Hands as a Hazard of the Veterinary Profession."

James Farquharson, Colorado State College, Fort Collins, Colo., president of AVMA; **H. E. Couchman,** St. Augustine, chief of the Man Power Division; and **H. M. Clarvoe,** Tampa, 459th Bomber Group, U. S. Army, addressed the meeting.

A veterinary quiz was held and the winners awarded prizes contributed by: Joe Gregorie for Pittman-Moore; L. A. Mosher for L. A. Mosher, Inc.; Lee Smith for Jensen-Salsbery Laboratories, Inc.; and C. E. Fanslau for Winthrop Chemical Company.

The new officers of the Association are: J. H. Yarborough, Miami, *president;* M. W. Emmel, Gainesville, *vice-president;* V. L. Burns, Williston, *secretary-treasurer.*

Georgia

Valdosta Meat Inspection.—In having played up the economics of municipal meat inspection to the point of over-doing the public health side, this service, established in 1912, was developed on the premise that meat inspection, although directed by the Board of Health, facilitates the local marketing of livestock, conserves material for fertilizer and feed, checks the spread of animal diseases, steps up employment, and helps the local merchants, all apart from protecting the public health. Persons who once thought meat inspection a nuisance and a waste of time and money are now convinced that the service is highly beneficial and would object to any movement designed to modify it. An editorial in the *Valdosta Daily Times* (Feb. 22, 1944) points out that local plants bought $278,783 worth of livestock in December, paid out $115,000 in wages, and bought $50,000 worth of supplies other than animals. The American Legion, Department of Georgia, at its annual convention at Atlanta passed strong resolutions praising Valdosta for its meat inspection service. E. D. King, Jr., (A.P.I., '16) is in charge.

Illinois

University Conference.—The 1944 university veterinary conference was a one-day session—October 4. Its principal events were two symposia (panels), one on bovine mastitis and one on bovine practice led by Chief Graham of the Department of Animal Pathology and Hygiene. President James Farquharson of the AVMA spoke on bovine practice and exhibited color films on bovine surgery. The other guest speakers were C. F. Clark, Michigan State College and G. H. Hopson of the DeLaval Separator Company, New York City. Clark spoke on "Sterility and Pregnancy", and Hopson on "Rapid Milking in the Prevention of Mastitis."

• • •

International Association of Milk Sanitarians.—The thirty-second annual meeting of the I.A.M.S. was held at the LaSalle Hotel, Chicago, Nov. 2-4, 1944, with President C. A. Abele of the Chicago Health Department presiding. Prominent veterinarians who contributed to the program were:

Geo. H. Hopson, DeLaval Separator Co., New York: "Why Milk Sanitarians Are Interested in Better Milking." This included a demonstration of rapid milking methods and care of milking equipment in which Dr. Hopson was assisted by K. J. Lindsey and Thomas Braddock.

C. S. Bryan, Michigan State College: "How to Handle the Mastitis Problem."

I. A. Merchant, Iowa State College, led the discussion of Dr. Bryan's presentation.

Col. Raymond Randall, V.C., Army Medical Center, Washington, D. C.: "The Army Milk-Control Program."

M. J. Fisher, Chief of Milk Control, St. Louis

Health Department, took part in a symposium on the methylene blue test.

Other program features included:

W. D. Frost, University of Wisconsin: "In Retrospect."

H. L. Thomason, Indiana State Board of Health: "A Typhoid Epidemic with a Cheddar Cheese Vector."

Harry Scharer, New York City Health Department: "Improved Techniques."

Milton J. Foter and **Roy D. Finley**, Pet Milk Co.: "Germicidal Efficiency of Can-Washing Compounds" and "Corrosion of Tin-Plate by Can-Washing Cleaners."

E. H. Parfitt, Evaporated Milk Association, Chicago: "The Sediment-Testing Technique."

J. O. Clark, Food and Drug Administration, Chicago: "Program of the Federal Food and Drug Administration as It Pertains to Dairy Products."

E. O. Gaumnitz, National Cheese Institute, Inc., Chicago: "The Over-All Picture in the Dairy Industry."

A symposium on the methylene blue test was presented by **A. W. Fuchs**, U. S. Public Health Service; **J. R. Jennings**, Iowa State Health Department; **M. J. Fisher**, St. Louis Health Department, and **E. G. Huffer**, Illinois State Health Department.

Geo. W. Putnam, Creamery Package Mfg. Co., Chicago, spoke on "Prospective Delevelopments in Dairy and Milk Plant Equipment." This was discussed by **S. V. Layson**, Illinois Creamery Supply Co., Chicago, and **Ernest J. Kelly**, Bureau of Dairy Industry, USDA.

The reports of a number of committees and the business session completed the program. The Association publishes the *Journal of Milk Technology*, of which J. H. Shrader, Walliston, Mass., and W. B. Palmer, Orange, N. J., are editor and managing editor, respectively. The publication is bimonthly and functions as the official organ for six other societies of milk sanitarians.

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County Health Boards.—The first fling at public health work in the state came by the passing of a law in 1872 naming the county commissioners as the local board of health. Five years later towns were empowered to establish official health agencies. It was not until 1901 that a law was enacted to provide a health service beyond municipal boundaries. In 1917, the General Assembly passed a weak, unworkable law authorizing local health division on the township plan, singly or combined. Only four such districts were ever founded. Successive legislatures defeated bills to establish state-wide county health boards on the ground that such boards might be made political footballs. Boiled down, life and health was a cheap commodity in a big state. In 1943, however, the General Assembly passed a bill authorizing counties interested to set up local health departments. Fifteen counties only (excluding Cook) have taken advantage of the law. The flaw in the law is that the adoption of the authority to establish a health force is left to the voters of the county on petition of 5 per cent of them, much as if disease was a respecter of county boundaries.—*From Illinois Health Messenger with editorial interpretation.*

Iowa

Midwest Association.—The Midwest Small Animal Association held its sixth annual clinical program at Burlington, Nov. 2, 1944. Morning, afternoon, and evening sessions were held. A special distraction was a "Demonstration of Trimming Problems in the Scotty, Wire-Hair and Cocker," by **Mrs. Louise Beckwith** of Des Moines and **Mrs. Earl Kennedy** of Moline, Ill. **Earl Hewitt** of Iowa State College spoke on surgical shock, blood transfusion, and nutrition in dogs, and **Glen Dunlap** of Kansas City, Mo., on rabies vaccination and management of animals exposed to rabies. Familiar names appear in the roster of this lively society: Kennedy, Beard, Riser, Meginnis, Collins, Dow, Krichel, Munger, Menary, Reardon, and Carter.

One wonders how much is gained by avoiding the word "veterinary" in the names of societies devoted to the cause of veterinary science. A certain bureau we know tried that and now it's being taken apart to see what's been making it tick.—*Ges Hoo.*

Kansas

What "Vets" Talk About is the title of a four-column article in *Kansas Farmer* for September reviewing the work the AVMA is doing for the health of American livestock as seen by the reporter at the Chicago session. Mortality of the young, expanded meat inspection, the threat of wildlife, record meat production, need of sanitation, dairy progress, sheep parasites, vitamins for cattle, trouble ahead, human health, poultry losses, sulfa drugs, livestock sales barns, victory over disease, are the headlines of material that carries a useful message to the livestock breeders. The article meets the foremost desires of the veterinary profession in its attempt to be useful to the American farmer.

Kentucky

The Central Association.—Thirty-two veterinarians of the Blue Grass region attended the October meeting of the Central Veterinary Medical Association, held at the Lafayette Hotel, Lexington. A round-table discussion of the diseases of food producing animals was held, hog cholera and brucellosis being the dis-

eases most discussed. Dr. H. B. Hamilton of the Veterinary Examination and Registration Board of Indiana, was a guest at the meeting.

s/E. F. PILE, *Secretary-Treasurer.*

Louisiana

Louisiana veterinarians were guests of the Louisiana Cattleman's Association at a barbecue on October 26, 1944, which was a part of the National Hereford Show and State Fair at Shreveport.

Dickie Young, the 13-year-old son of Dr. and Mrs. A. V. Young, Shreveport, set a new record in Louisiana 4-H Club competition at the State Fair, when he won all first prizes and both champion and reserve champion on his Aberdeen-Angus calves. Dickie had previously won champion showmanship honors at the annual State 4-H Show in Baton Rouge last April.

s/A. H. GROTH

Maine

State Association.—The *Quarterly News Letter* of the Maine Veterinary Medical Association announces the meeting of October 18, at Lewiston, a clinic at the fair grounds, demonstration of milking machines and a visit to the bull farm of the Androscoggin Valley Artificial Breeding Association and gives a detailed account of the July meeting under the shade trees of Dr. Whitcomb's establishment. Recorded for July are:

E. E. Russell, Farmington: "Restraint of Horses" (a demonstration).

H. N. Eames, Brunswick: "Castration" (a demonstration of etherization in the standing position).

Alton Richardson, Waterville: *Ibid.*

E. C. Moore, Lewiston: "Ablation of a Tumor of the Tail under Epidural Analgesia" (a demonstration).

E. G. Sadler, Ellsworth, *et al.* "Flank Operation on a Cryptorchid Boar under Ether Anesthesia" (a demonstration).

S. W. Stiles, Falmouth Foreside: "Sutureless Spaying of a Young Bitch" (a demonstration).

R. W. Smith, Laconia, N. H.: "Retrospective Reflections" (a philosophical talk on "what's been, what's cooking, and what's coming), and who can reminisce, ruminate, and predict better than this particular Smith.

P. R. Baird, Waterville: "Ants and Termites" (a wartime film).

Thanks is extended to the *Republican Journal* of Belfast for editorial mention of the meeting and the publication of pictures supplied by *Allied Veterinarian, Journal of the AVMA, North American Veterinarian,* and *Our Dumb Animals.*

The *Bulletin* announces that all of the Bureau force in Augusta were promoted under the recent reclassification passed by Congress in March.

Maryland

University Honors Major General Kirk.—Major General Norman T. Kirk received the honorary degree of Doctor of Science from his alma mater, the University of Maryland, at the commencement exercises of the Schools of Medicine and Nursing, Sept. 29, 1944. The citation was read by former Surgeon General Robert U. Patterson, now dean of the medical faculty.

Massachusetts

State Association.—The October meeting of the Association was held at the Hotel Vendome, Oct. 25, 1944. The program included the following:

E. C. Bulger: "Diseases of the Eye" (a review).

R. H. Bruce: "Large Animal Practice."

R. Frohlich: "Calf Health" (a broadcast).

s/H. W. JAKEMAN, *Secretary.*

Middle America

Good Neighbor Policy.—Nowhere has the grand strategy of international coöperation had greater meaning than in our relations with the independent republics of Middle America (Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama) and the insular states of Cuba, Haiti, and the Dominican Republic, for besides being neighbors in fact, the commodities we produce find eager market there and in reverse their decisive tropical character brings us next door to crops we do not raise. Middle America Information Bureau of New York, conducted by the United Fruit Company is doing yeoman service in promoting close relations with these countries. The New World, home of freedom through the democratic form of government, has a duty to perform in the postwar period.

Missouri

Edward Lapple, St. Louis, retired Sept. 21, 1944, after thirty years with the U. S. Department of Agriculture. He will make his home with his brother in Fairfield, Ohio.

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Kansas City's Director of Health.—*The K.C.V.C. Alumni Quarterly,* Charles D. Folse, editor, reminds its readers that Dr. Hugh L. Dwyer, director of health of Kansas City, is a fellow alumnus. He graduated at the Kansas City

Veterinary College in 1911 and served two years in the federal meat-inspection service preceding his entrance into the field of human medicine. Dr. Dwyer received his M.D. and Ph.D. degrees at Tulane University, and took graduate work at Columbia University. He is prominent in the fields of pediatrics and public health and was onetime president of the American Association of Medical Milk Commissions. The excellent milk and meat hygiene of Kansas City is attributed to the breadth of this training.

Mississippi

State Veterinarian Retires.—E. S. Brashier (C.V.C., '13), longtime state veterinarian, retired to private life, effective September 30.

E. S. Brashier

Following his graduation, Dr. Brashier became a member of the teaching staff of his alma mater, moving to Mississippi after the closing of that college.

New Hampshire

Veterinary Practitioners' Round Table.—Practitioners bordering the interstate boundary between New Hampshire and Maine hold more or less regular round-table meetings to discuss the clinical problems of their day. At the August meeting in Wolfeboro, N. H., for example, the subjects were (1) laminitis of horses, (2) acetonemia in cows, (3) filariasis in dogs, and (4) artificial insemination of cows. At the next meeting, at **E. E. Russell's**, Farmington, Me., 11 practitioners around the table discussed (1) heat and sun stroke, (2) metritis in mares and cows, and (3) metritis in the dog and cat. A meeting on November 9, was held at **S. W. Stile's**, Falmouth Foreside. —*From Quarterly News Letter.*

s/B. J. CADY.

Oklahoma

Dr. J. C. Matlock, El Reno, has recently purchased the hospital and practice of the late Dr. W. H. Martin.

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Capt. Omar G. Werntz (Tex., '40) who has commanded a mortar platoon since the First Cavalry Division was mechanized and moved to the Southwest Pacific theater, has been reassigned to the Veterinary Corps. In October, the Public Relations Office of his division announced from "somewhere in the Southwest Pacific" that the Captain's unit fought throughout the Admiralty Islands campaign. Captain Werntz was commissioned in the Veterinary Corps in 1940. He has been a member of the AVMA since graduating.

Pennsylvania

North Western Association. — The North Western Pennsylvania Association met for a dinner session, Oct. 10, 1944, with **H. M. Mershon**, Linesville. **J. J. Thomas**, Harrisburg, spoke on "Meat Inspection and Other Bureau Work." Round-table discussions followed.

s/P. L. ROUSE, *Secretary.*

Washington

Dr. Harvey R. Cooper, Wenatchee, has recently taken over the practice of Dr. S. T. Miller who is retiring.

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The first fulltime county health department in continental United States was established in Yakima county in 1911. This step is pointed out in public health circles as the start of county health departments of which there are too few.

Wisconsin

Southeast Association.—An instructive talk on "Milking Mechanically" by **Dr. George Hopson**, New York City, was heard by 62 veterinarians at the meeting of the Southeast Wisconsin Veterinary Medical Association, held at Columbus, Oct. 12, 1944.

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Northeast Association.—Fifty veterinarians attended the meeting of the Northeast Wisconsin Veterinary Medical Association, held at Clintonville, Oct. 18, 1944. **Dr. E. C. Jesperson**, Omro, gave a paper on "Mastitis".

STATE BOARD EXAMINATIONS

Arizona—The Arizona State Board of Veterinary Medical Examiners will hold its next examination at the Capitol Bldg., Phoenix, Ariz., Dec. 13-14, 1944. For necessary applica-

tion blanks address J. C. Fletcher, Secretary of the Board, Route 7, Box 405 A, Phoenix, Ariz.

Indiana—The Indiana State Veterinary Examining Board will hold its next examination at Indianapolis, Ind., Jan. 9, 1945. All inquiries should be addressed to J. L. Axby, Secretary of Examining Board, 209-10 State House, Indianapolis 4, Ind.

New Jersey—The New Jersey State Board of Veterinary Examiners will hold its next examination at the State House, Trenton, N. J., Dec. 29-30, 1944. All inquiries should be addressed to J. A. S. Millar, Secretary of Examining Board, Box 318, Deal, N. J.

COMING MEETINGS

Delaware Veterinary Medical Association. Wilmington, Del., Dec. 4, 1944. C. C. Palmer, University of Delaware, Newark, Del., secretary.

United States Live Stock Sanitary Association. LaSalle Hotel, Chicago, Ill., Dec. 6-7-8, 1944. R. A. Hendershott, Trenton, N. J., secretary-treasurer.

Arizona Veterinary Medical Association. Phoenix, Ariz., Dec. 15-16, 1944. Vego Mikkelson, 217 Capitol Bldg., Phoenix, Ariz., secretary.

Ohio State Veterinary Medical Association. Deshler-Wallick Hotel, Columbus, Ohio, Jan. 3-5, 1945. R. E. Rebrassier, Ohio State University, Columbus, secretary.

University of Pennsylvania. Annual conference for veterinarians, School of Veterinary Medicine, 39th & Woodland Ave., Philadelphia, Jan. 2-3, 1945. G. A. Dick, dean.

Cornell University. Annual Conference for Veterinarians, New York State Veterinary College, Ithaca, N. Y., Jan. 3-5, 1945. M. G. Fincher, New York State Veterinary College, acting dean.

Minnesota State Veterinary Medical Society. Lowry Hotel, St. Paul, Minn., Jan. 8-10, 1945. H. C. H. Kernkamp, University Farm, St. Paul 8, Minn., secretary.

California State Veterinary Medical Association. Annual winter meeting and short course. San Luis Obispo, Calif., Jan. 8-10, 1945. F. P. Wilcox, 4219 Kenwood Ave., Los Angeles 37, Calif., secretary.

Indiana Veterinary Medical Association. Hotel Severin, Indianapolis, Ind., Jan. 9-11, 1945. H. A. Lidikay, Darlington, Ind., secretary.

Illinois State Veterinary Medical Association. Leland Hotel, Springfield, Ill., Jan. 18-19, 1945. C. C. Hastings, Williamsville, Ill., secretary.

Iowa State Veterinary Medical Association. Hotel Fort Des Moines, Des Moines, Iowa, Jan. 23-25, 1945. C. C. Franks, 855 31st St., Des Moines, Iowa, secretary.

Ontario Veterinary Association. Royal York Hotel, Toronto, Jan. 25-26, 1945. F. H. S. Lowrey, 2555 Bloor St. W., Toronto, Ont., secretary.

New Jersey Veterinary Medical Association. Hotel Hildebrecht, Trenton, N. J., Feb. 1-2, 1945. J. R. Porteus, P. O. Box 938, Trenton, N. J., secretary.

Virginia State Veterinary Medical Association. Hotel Roanoke, Roanoke, Va., Jan. 30-Feb. 1, 1945. E. P. Johnson, Box 593, Blacksburg, Va., secretary.

Kentucky Veterinary Medical Association. Agricultural Experiment Station Farm, University of Kentucky, Lexington, Ky., Feb. 1-2, 1945. F. M. Kearn, 3622 Frankfort Ave., Louisville 7, Ky., secretary-treasurer.

Southern Veterinary Medical Association. There will be no meeting held in 1944. L. A. Mosher, P. O. Box 1533, Atlanta, Ga., secretary.

MARRIAGES

Dr. R. H. Romaker (O.S.U., '44), 224½ W. Wisconsin St., Portage, Wis., to Miss Louise Brewster, Kenton, Ohio, Oct. 8, 1944.

BIRTHS

To Dr. (A.P.I., '42) and Mrs. T. C. Deal, Burgan, N. Car., a daughter, Patsy Jane, Aug. 23, 1944.

DEATHS

Zeno C. Boyd (K.C.V.C., '07), Raleigh, N. Car., died recently. Dr. Boyd was admitted to the AVMA in 1918.

Harry D. Hanson (Amer., '89), Darien, Conn., died Feb. 22, 1944. Dr. Hanson was admitted to the AVMA in 1892.

Jacob J. Hoffmann (O.V.C., '12), Cincinnati, Ohio, died recently. Dr. Hoffmann was admitted to the AVMA in 1922.

Charles Howe Klein, Albany, Ga., lost his life while surf bathing at Daytona Beach, Fla., on Sept. 10, 1944. He was 28 years old.

Walter Martin (Ont., '04), 68, Jonesboro, Ark., died July 14, 1944. Dr. Martin had been a member of the AVMA since 1923.

R. A. Ramsay (Mont., '92), 83, Takoma Park, Md., died Nov. 5, 1944. Dr. Ramsay was chief of the Tick Eradication Division from 1917 to 1932, having entered the service of the Bureau of Animal Industry in 1899. In 1907 he was assigned to administrative duties in Washington, D. C., where he continued to serve until the time of his retirement in 1932.

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